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Recognizing Alloy Steels by Ingot Structure

Visual and Laboratory Selections of Steels by
Temper Numbers—Differing Requirements of Tool
and Other Steels and the Alloys to Meet Them

BY E. T. EDWARDS*

A careful analysis of the manufacture of special-alloy and carbon steels within the last few years will show interesting, rapid and valuable progress. This progress has been along certain definite lines, particularly in relation to the composition and heat treatment. It is also marked by the number of special tool steels now being made to meet the many characteristic demands. This is so general that the tool steel manufacturer who wishes to keep abreast of the times finds himself not making one or two grades of car-

possibly several other combinations that are used and recommended for special purposes. As the uses and applications multiply the steelmaker is called upon not only to provide a greater variety of kinds and quality than ever before, but he is also expected to meet to almost absolute perfection a host of most exacting specifications. The ultimate aim of the manufacturer is to meet, to the present limit of the steel-maker's art, the problems that present themselves from time to time.

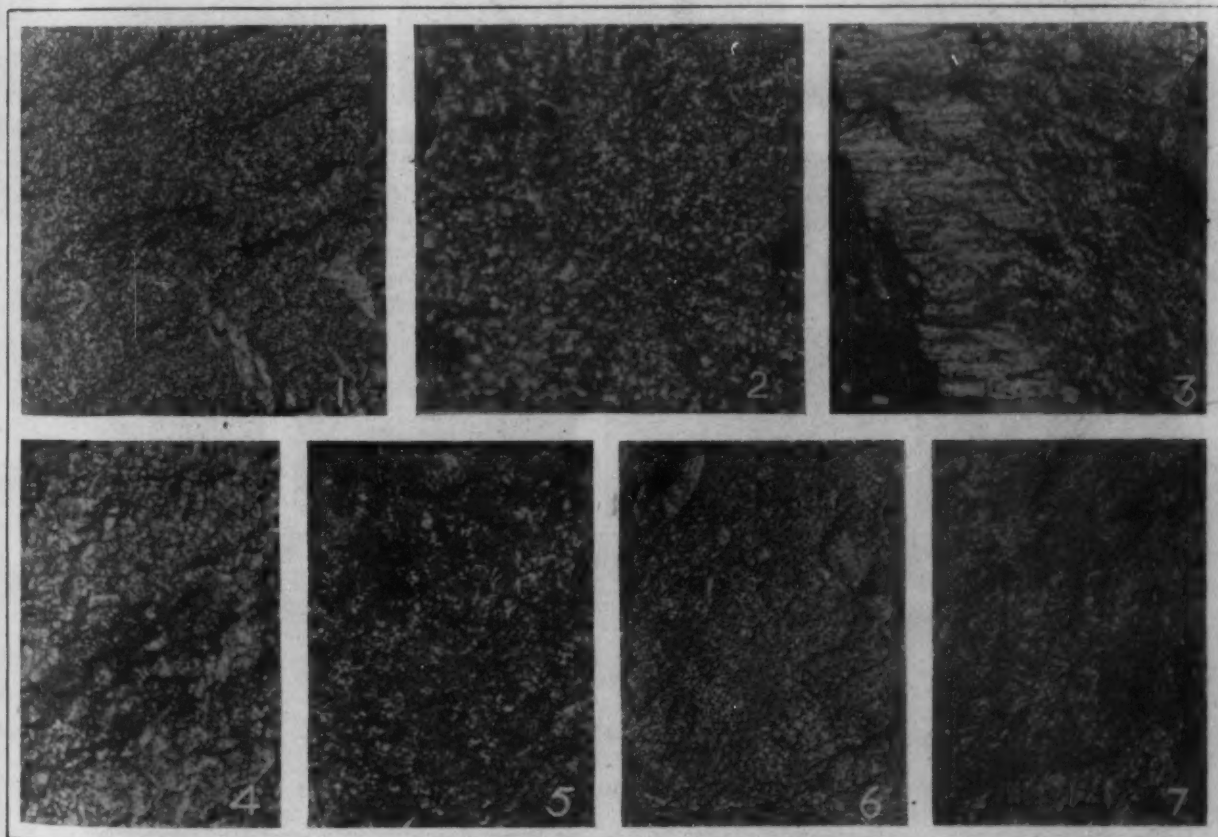


Fig. 1—Fractures of Ingots of Straight Carbon Steels. No. 1—0.74 per cent. carbon, or $3\frac{1}{2}$ temper; No. 2—0.86 per cent. carbon, or 4 temper; No. 3—0.92 per cent. carbon, or $4\frac{1}{2}$ temper; No. 4—1.07 per cent. carbon, or 5 temper; No. 5—1.15 per cent. carbon, or $5\frac{1}{2}$ temper; No. 6—1.26 per cent. carbon, or 6 temper; No. 7—1.34 per cent. carbon, or $6\frac{1}{2}$ temper.

bon steel and one or possibly two grades of high-speed steel, as was the custom a few years ago, but several grades of carbon steel, two or more grades of high-speed steel, nickel-vanadium steels, chrome-nickel-vanadium steels, nickel-chrome steels, vanadium-chrome steels, high-silicon and high-manganese steels, and plain carbon steels, with

Demands for Dynamic Qualities in Steel

The present general tendency is to develop steel of higher elastic limits and greater tensile strength, without impairing the ductility, and more attention is being paid day after day to what are known as dynamic qualities. A steel high in dynamic qualities is one that will stand repeated strains without deteriorating rapidly; these qualities are measured in many different ways and by various meth-

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ods. All this has eventually led to more and more complex steel, so that now, instead of steel being influenced alone by the single element carbon, all the influence, simple and compound, of several predominating elements is found embodied in numerous grades of steel.

Nickel, chromium, silicon, manganese, vanadium and titanium have been introduced to produce certain desired results and are used in such quantities as to justify the giving of special names to the steel in which they are contained. To distinguish these steels from the ordinary steels of commerce known as carbon steels (in which carbon and iron are the influencing elements, the other elements being considered as impurities, and not useful ingredients) the term alloy-steel is usually applied. Hadfield's manganese steel can be considered as one of the most unique of alloy steels. This steel, as originally made, contained from 4 to 6 per cent. manganese and proved exceedingly hard and brittle. When the manganese contents were increased to about 12 per cent. the steel combined extraordinary properties of hardness and toughness. It is non-magnetic, hard and tough, and is used for a number of special purposes where high resistance to abrasion is required, for which uses it seems especially adapted. It cannot be machined

steels. The various ingredients used in high-speed steel are varied in amount for twist drills, lathe and planer tools, and in dies for hot work, etc. One grade of steel excels in a certain kind of work and another excels in another kind. Speaking in general, a change in the composition of any steel results in some change in its properties. Chromium usually raises the tensile strength and elastic limit without impairing the ductility. Traces of this element in a carbon steel causes it to be hard through to the center; this element also causes carbon steel to harden at a slightly lower temperature; in too large quantities it may cause brittleness. Steels containing chromium require extreme care in treating. Manganese can impart extreme strength and toughness when used in large quantities as shown in Hadfield's steels. Nickel alloys with iron and steel very readily and generally increases their hardness, toughness and tenacity. The ratio of the elastic limit and the tensile strength is raised by this element when chromium is present. Titanium is used in large quantities in rail steel and is generally considered an excellent scavenger. Small amounts of silicon are used as a scavenger or purifier; in larger quantities it generally improves the physical properties; steels containing 2 per cent. of silicon have been used

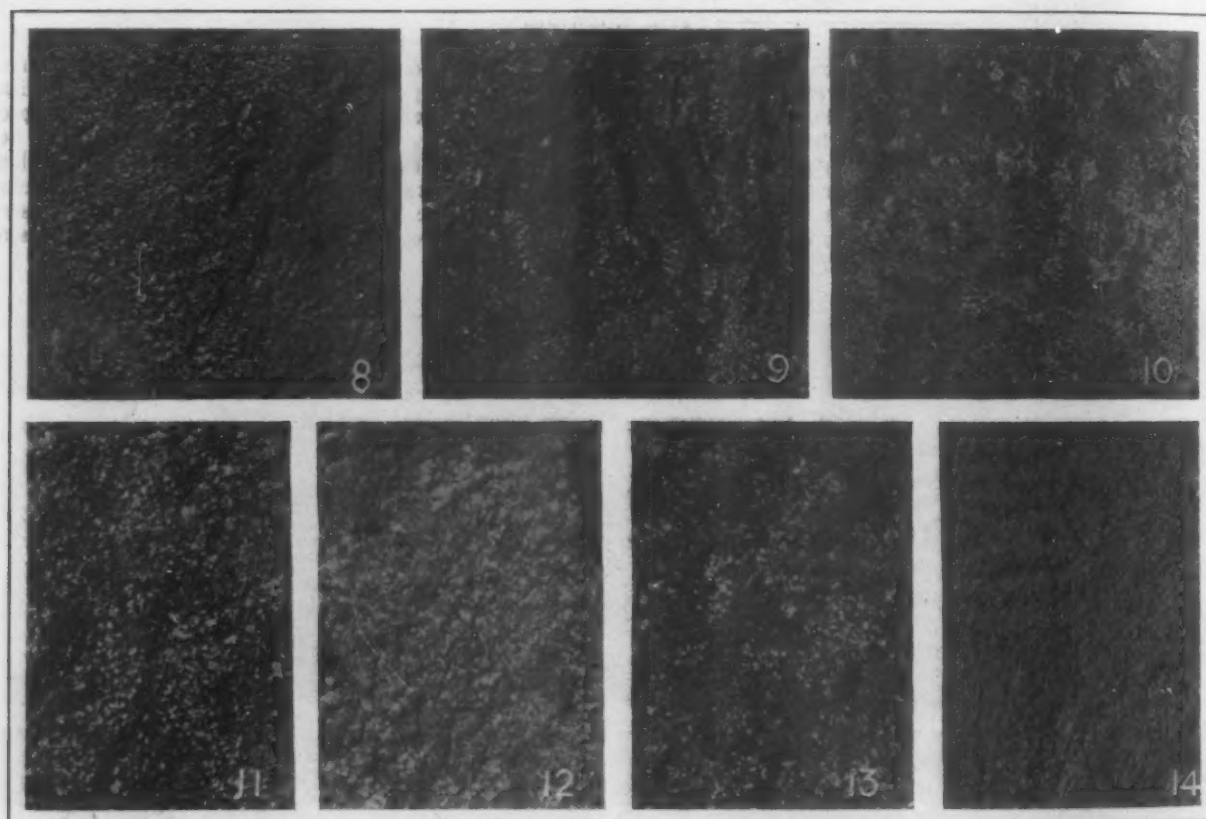


Fig. 2—Fractures of Ingots of Alloy Steels

| | | |
|---|--|--|
| No. 8—Carbon 0.95 per cent. Chromium 3.5 per cent. Manganese .60 per cent. | No. 9—Carbon 1.00 per cent. Manganese .30 per cent. Silicon .80 per cent. | No. 10—Carbon 0.65 per cent. Tungsten 5.50 per cent. Manganese .30 per cent. |
| No. 11—Carbon 0.97 per cent. Silicon .40 per cent. Manganese .30 per cent. Tungsten 2.13 per cent. | No. 12—Carbon 0.40 per cent. Chromium .75 per cent. Vanadium .25 per cent. | No. 13—Carbon 1.00 per cent. Chromium .79 per cent. Vanadium .27 per cent. |
| | | No. 14—Carbon 0.65 per cent. Chromium 4.45 per cent. Tungsten 18.0 per cent. Vanadium .90 per cent. |

except with the greatest difficulty, and has been considered unannealable until within a very short time, when methods that are entirely opposite to those in general use have been successfully applied for annealing this steel.

The one element that stands out with greater prominence than all others and the one that has become general in use within the past year or two is the element vanadium. Steels containing vanadium possess very high dynamic properties; it is usually recommended that these steels be given simplified heat treatment before they are used for the purpose intended. The word simplified is used as this treatment usually consists of only heating to about 850 or 900 deg. C. and quenching in oil or water; the temper is then drawn to suit the requirements.

No One Steel Suitable for All Purposes

No one steel has been developed that seems to answer for all general purposes; this is also true of high-speed

with excellent results for gears and have proved very tough.

Traces of tungsten have been added to some classes of chisel steel, and its use is considered beneficial. It is used in larger quantities in magnet steel to increase the hardness and retentivity of the magnetic forces, about 5 to 6 per cent. being considered as giving the best results. Its chief use, however, is in high-speed steels, in which class of steel up to 8 and 20 per cent. are found. The properties imparted by vanadium, except as its use as a scavenger, have already been touched upon.

Tests of Grading Tool Steel by the Eye

It is the main purpose, or scope, of this paper to point out the changes in ingot structure that have taken place due to the addition of these various elements, and to show how it was possible to predict by the eye the amount of car-

bon present in carbon steels when other elements are absent. The grading of ingots in former years was done in this manner, while now the laboratory must be depended upon to make a classification. The custom of tempering or grading carbon steel ingots by the eye and simply running a few combustion carbon determinations as a check on the temperer's work has been in vogue for a number of years.

A table of tempers in general use among tool steel manufacturers is about as given. This table is varied by some to meet certain requirements and conditions, but it covers a range of steels for extensive purposes.

Table I.—Tool Steel Tempers.

| Temper Number | Includes All Ingot Containing |
|---------------|-------------------------------|
| 3 | 0.60 to 0.69 percent Carbon. |
| 3½ | 0.70 to 0.79 percent Carbon. |
| 4 | 0.80 to 0.89 percent Carbon. |
| 4½ | 0.90 to 0.99 percent Carbon. |
| 5 | 1.00 to 1.09 percent Carbon. |
| 5½ | 1.10 to 1.19 percent Carbon. |
| 6 | 1.20 to 1.29 percent Carbon. |
| 6½ | 1.30 to 1.39 percent Carbon. |
| 7 | 1.40 to 1.49 percent Carbon. |

Tables II, III and IV show the results of some recent tests made by three experienced temperers or graders, whom we will designate as A, B and C, on judging the carbon present in a number of ingot corners of plain carbon steel. The method followed was first to have A grade the ingots from the appearance of the fracture; after A had completed the work, B was called upon to grade them by the fracture also, without knowing what tempers A had designated them as being; then C was asked to follow B in the same manner. Eventually the ingots were taken to the laboratory and combustion carbons were made in duplicate, on each ingot by very competent chemists in the usual manner. The results of these tests are extremely interesting.

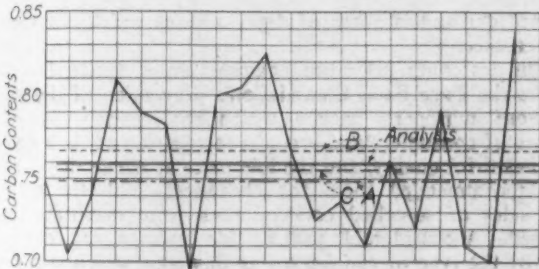


Fig. 3—Chart of Observations Given in Table II

Table II.—Eye Prediction of Steel Tempers Compared with Analysis.

| Ingot No. | Temper No. as designated by | | | Laboratory | | Actual Temper from Laboratory Analysis | |
|-----------|-----------------------------|-----|-----|------------|-----------|--|---------|
| | "A" | "B" | "C" | First Test | Duplicate | Carbon | Temper |
| 1 | 3½ | 3½ | 3½ | 0.74 | 0.76 | 0.75 | 3½ |
| 2 | 3½ | 3 | 3 | 0.70 | 0.71 | 0.70½ | 3½ low |
| 3 | 3½ | 3½ | 3½ | 0.72 | 0.76 | 0.74 | 3½ |
| 4 | 3½ | 3½ | 3½ | 0.79 | 0.83 | 0.81 | 4 low |
| 5 | 3½ | 3½ | 4 | 0.80 | 0.78 | 0.79 | 3½ full |
| 6 | 3½ | 4 | 4 | 0.79 | 0.78 | 0.78½ | 3½ |
| 7 | 3½ | 3½ | 3 | 0.70 | 0.69 | 0.69½ | 3 |
| 8 | 3½ | 3½ | 3½ | 0.77 | 0.83 | 0.80 | 4 |
| 9 | 3½ | 4 | 4 | 0.80 | 0.81 | 0.80½ | 4 |
| 10 | 3½ | 4 | 4 | 0.84 | 0.81 | 0.82½ | 4 |
| 11 | 3½ | 3½ | 3½ | 0.78 | 0.75 | 0.76½ | 3½ |
| 12 | 3½ | 3½ | 3½ | 0.72 | 0.73 | 0.72½ | 3½ |
| 13 | 3½ | 3½ | 3½ | 0.76 | 0.71 | 0.73½ | 3½ |
| 14 | 3½ | 3 | 3½ | 0.71 | 0.71 | 0.71 | 3½ low |
| 15 | 3½ | 3½ | 3½ | 0.75 | 0.77 | 0.76 | 3½ |
| 16 | 3½ | 3½ | 3 | 0.70 | 0.74 | 0.72 | 3½ |
| 17 | 3½ | 3½ | 3½ | 0.78 | 0.80 | 0.79 | 3½ full |
| 18 | 3½ | 3½ | 3½ | 0.70 | 0.72 | 0.81 | 3½ |
| 19 | 3½ | 3½ | 3½ | 0.70 | 0.70 | 0.70 | 3½ |
| 20 | 3½ | 4 | 3½ | 0.83 | 0.85 | 0.84 | 4 |

*Where the figures are given in quarters attempts were made to read to five points carbon.

The accompanying charts are curves drawn from the data given in the tables. Combining and averaging the whole series, the following percentages of carbon contained are obtained:

- Actual carbon contents, by analysis....0.9363 per cent.
- Actual carbon contents, by A......9330 per cent.
- Actual carbon contents, by B......9250 per cent.
- Actual carbon contents, by C......9490 per cent.
- Assuming ten full points of carbon, or one full temper, equal to 100 per cent., then:
- A was 3.3 per cent. low.
- B was 11.3 per cent. low.
- C was 12.7 per cent. high.

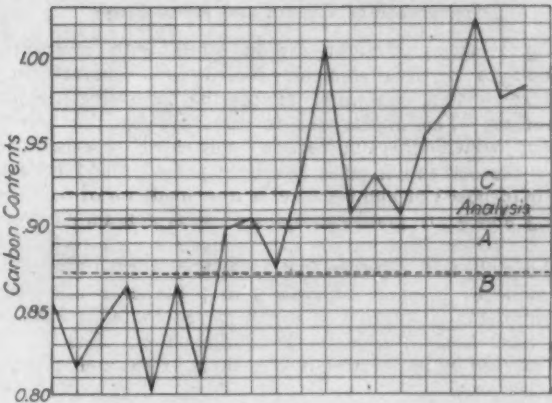


Fig. 4—Chart of Observations Given in Table III

Table III.—Eye Prediction of Steel Tempers Compared with Analysis.

| Ingot No. | Temper No. as designated by | | | Laboratory | | Actual Temper from Laboratory Analysis | |
|-----------|-----------------------------|-----|-----|------------|-----------|--|---------|
| | "A" | "B" | "C" | First Test | Duplicate | Carbon | Temper |
| 21 | 4 | 4 | 4 | 0.87 | 0.84 | 0.85½ | 4 |
| 22 | 4 | 3½ | 4 | 0.82 | 0.81 | 0.81½ | 4 |
| 23 | 4 | 3½ | 4 | 0.83 | 0.85 | 0.84 | 4 |
| 24 | 4 | 4 | 4 | 0.88 | 0.84 | 0.86 | 4 |
| 25 | 4 | 4 | 4 | 0.81 | 0.79 | 0.80 | 4 low |
| 26 | 4 | 4½ | 4½ | 0.84 | 0.89 | 0.86½ | 4 |
| 27 | 4 | 4 | 4 | 0.81 | 0.81 | 0.80 | 4 |
| 28 | 4 | 4 | 4½ | 0.89 | 0.91 | 0.90 | 4½ |
| 29 | 4 | 4 | 4 | 0.88 | 0.93 | 0.90½ | 4½ |
| 30 | 4 | 4 | 4½ | 0.87 | 0.87 | 0.81 | 4 |
| 31 | 4½ | 4½ | 4½ | 0.91 | 0.95 | 0.93 | 4½ |
| 32 | 4½ | 4½ | 5 | 1.00 | 1.01 | 1.00½ | 5 |
| 33 | 4½ | 4 | 4½ | 0.90 | 0.90 | 0.90½ | 4½ |
| 34 | 4½ | 4 | 4½ | 0.93 | 0.93 | 0.93 | 4½ |
| 35 | 4½ | 4 | 4 | 0.90 | 0.91 | 0.90½ | 4½ |
| 36 | 4½ | 4½ | 4½ | 0.97 | 0.94 | 0.95½ | 4½ |
| 37 | 4½ | 4 | 4½ | 0.97 | 0.98 | 0.97½ | 4½ |
| 38 | 4½ | 4½ | 5 | 1.01 | 1.04 | 1.02½ | 5 |
| 39 | 4½ | 4 | 4½ | 1.00 | 0.95 | 0.97½ | 4½ |
| 40 | 4½ | 4½ | 4½ | 1.01 | 0.96 | 0.98½ | 4½ full |

The series of photographs here reproduced of the fractured end of a number of ingots show clearly the change in appearance of the fracture not only due to varying the amount of carbon contained but also due to the addition of other elements.

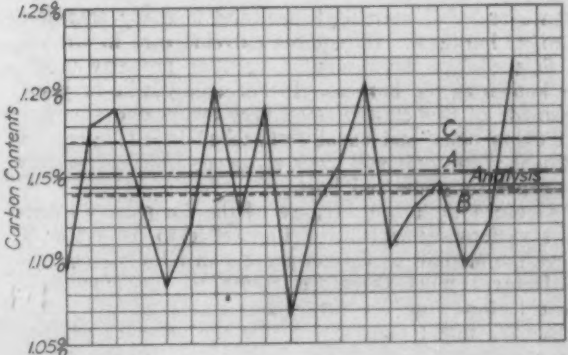


Fig. 5—Chart of Observations Given in Table IV

Table IV.—Eye Prediction of Steel Tempers Compared with Analysis.

| Ingot No. | Temper No. as designated by | | | Laboratory | | Actual Temper from Laboratory Analysis | |
|-----------|-----------------------------|-----|-----|------------|-----------|--|--------|
| | "A" | "B" | "C" | First Test | Duplicate | Carbon | Temper |
| 41 | 5½ | 5½ | 5 | 1.12 | 1.07 | 1.09½ | 5 full |
| 42 | 5½ | 5½ | 5½ | 1.17 | 1.19 | 1.18 | 5½ |
| 43 | 5½ | 5½ | 6 | 1.19 | 1.19 | 1.19 | 5½ |
| 44 | 5½ | 5½ | 5½ | 1.15 | 1.23 | 1.14 | 5½ |
| 45 | 5½ | 5½ | 5½ | 1.09 | 1.08 | 1.08½ | 5 full |
| 46 | 5½ | 5½ | 5½ | 1.13 | 1.11 | 1.12 | 5½ |
| 47 | 5½ | 6 | 5½ | 1.19 | 1.22 | 1.20½ | 6 |
| 48 | 5½ | 5 | 5½ | 1.10 | 1.15 | 1.12½ | 5½ |
| 49 | 5½ | 5½ | 5½ | 1.19 | 1.19 | 1.19 | 5½ |
| 50 | 5½ | 5 | 5 | 1.07 | 1.06 | 1.06½ | 5 |
| 51 | 5½ | 5½ | 5½ | 1.09 | 1.17 | 1.13 | 5½ |
| 52 | 5½ | 5½ | 5½ | 1.18 | 1.13 | 1.15½ | 5½ |
| 53 | 5½ | 5½ | 5½ | 1.18 | 1.23 | 1.20½ | 6 |
| 54 | 5½ | 5½ | 5½ | 1.11 | 1.10 | 1.10½ | 5½ |
| 55 | 5½ | 5½ | 5½ | 1.13 | 1.13 | 1.13 | 5½ |
| 56 | 5½ | 5½ | 5½ | 1.15 | 1.14 | 1.14½ | 5½ |
| 57 | 5½ | 5 | 5½ | 1.10 | 1.09 | 1.09½ | 5½ low |
| 58 | 5½ | 5½ | 5½ | 1.11 | 1.13 | 1.12 | 5½ |
| 59 | 5½ | 5½ | 6 | 1.19 | 1.25 | 1.22 | 6 |
| 60 | 5½ | 5½ | 6 | 1.22 | 1.22 | 1.22 | 6 |

Appearance of Carbon and Alloy Steels

Fig 1 shows straight carbon steels with increasing percentages of this element. No. 1 is a characteristic fracture of steel containing almost the saturating amount of carbon. The appearance is governed by the ferrite present which crystallizes in polyhedral grains. In No. 2 the saturation point has been passed, the ferrite is mostly disposed of and the steel is now made up of pearlite. Nos. 3 and 4 are good examples of steel containing from 0.90 to 1.10 per cent. carbon; these steels are characterized by the elongated crystals that invariably form parallel to the plane of cooling; in Nos. 5 to 7 inclusive cementite predominates. Cementite is found in segregated masses in very hard steel in which it is almost structureless. It is also marked by its metallic lustre and is bright and brilliant in appearance.

Fig. 2 shows alloy-steels. No. 8, in the ingot form, has a fracture similar to No. 1 of the straight carbon group, though usually it is much lighter in appearance and has more of a metallic lustre. This steel hardens uniformly and becomes glass hard even at low temperatures; it is usually given a special treatment, after which it makes excellent dies for hot work, such as gripper dies and dies for heading hot bolts and rivets. No. 9 in the ingot form is more or less structureless. No. 10 is a special magnet steel, the appearance of which is most characteristic. It has a high metallic lustre and appears to be made up of very thin plates or laminae; in appearance it is most strongly suggestive of mother-of-pearl. This is a grade of steel made especially for permanent magnets and is largely used in electrical measuring instruments where permanency of magnetism is essential; it is also used for some special purposes where both toughness and hardness are required. No. 11 is very granular in appearance; this steel makes excellent finishing tools for roll work. Nos. 12 and 13 are the usual grade of chrome-vanadium steel, with varying percentages of carbon. These steels are extremely tough; even in the ingot form it is very difficult to break off corners for laboratory analysis. The outline of the grains as they crystallize is very distinctly shown. The appearance is much like No. 4 temper carbon steel; this fracture is apparently influenced by the ferrite present, as the crystallization takes place in large masses in apparently polyhedral grains.

The last cut is a sample of high-speed steel; it crystallizes in very fine grains, is extremely dense, has a white appearance and dull metallic lustre, and is easily fractured, due to its hardness. It requires extreme care in working into finished bars because of a peculiar property it possesses known as red hardness. In hardening lathe or planer tools made of this class of steel they are heated almost to the melting point and usually quenched in oil; after this treatment these tools will work at speeds sufficient to draw the temper to a low red heat.

As before explained, because of the complexity caused by the various elements, it is impossible to determine by the eye the amount of carbon present in alloy steels. The manufacturer must therefore resort to the combustion carbon method for accurate classification of alloy steel ingots. We might add further that the presence of these foreign elements, even though insignificant in amount, influences greatly the freezing of masses of steel containing them, in some cases lowering and in others raising the freezing point.

"An Investigation of the Strength of Rolled Zinc," by Herbert F. Moore, is issued as Bulletin No. 52 of the Engineering Experiment Station of the University of Illinois. This bulletin records results of tests made in the laboratory of the university on the tensile, compressive and shearing strength of zinc. The results of these tests are tabulated and compared with the results of tests of zinc made in European laboratories. A discussion of the strength and ductility of zinc is given. The resisting power of zinc to stress was found to be from 30 to 40 per cent. of that of soft steel. Copies may be obtained gratis upon application to W. F. M. Goss, Director of the Engineering Experiment Station, University of Illinois, Urbana, Ill.

The Woodstock furnace of the Anniston Iron Corporation, Anniston, Ala., will probably be blown out early in March.

The American Can Company's Report

A Heavy Increase in Earnings Over 1910

The American Can Company has issued its annual report for the year ended December 31. The income account compares as follows with 1910:

| | 1911. | 1910. |
|--------------------|-------------|-------------|
| Earnings | \$5,416,339 | \$3,456,537 |
| Depreciation | 2,500,000 | 633,564 |
| Net profit | \$2,916,339 | \$2,822,972 |

The earnings were \$1,959,802 in excess of the previous year, and \$1,866,436 was charged off for depreciation above the amount thus charged off in 1910.

The general balance sheet as of December 31 compares as follows:

| <i>Assets.</i> | | 1911. | 1910. |
|---------------------------------------|--|--------------|--------------|
| Plants, real estate, etc. | | \$71,233,481 | \$73,199,038 |
| Improvements and new construction.... | | 8,907,618 | 7,654,480 |
| Other investments | | 337,238 | 856,208 |
| Cash | | 3,538,999 | 1,377,417 |
| Bills and accounts receivable..... | | 3,315,204 | 3,622,743 |
| Merchandise inventory | | 5,785,218 | 4,084,026 |
| Total | | \$93,119,759 | \$91,793,913 |
| <i>Liabilities.</i> | | 1911. | 1910. |
| Preferred stock | | \$41,233,300 | \$41,233,300 |
| Common stock | | 41,233,300 | 41,233,300 |
| Accounts payable | | 1,476,310 | 949,997 |
| Dividends payable | | 515,416 | 515,416 |
| Contingent funds | | 985,694 | 1,072,012 |
| Surplus | | 7,675,738 | 6,789,888 |
| Total | | \$93,119,759 | \$91,793,913 |

From President W. T. Graham's accompanying remarks the following extracts are taken:

The company did not suffer from the unfavorable conditions which have been reported by many industrial concerns over the year 1911. As has been pointed out in previous reports, its products, being used in connection with supplies of daily consumption, are not so subject to restricted demand in years of depression as articles of mere convenience.

The lessening prejudice against canned foods, largely due to the Pure Food Commission's prevention of the sale of those improperly packed, which has inspired the confidence of consumers and brought recognition of their good and healthful quality, and the low price at which they were sold recommended them for cheapness, with the result that sales of so-called packers' cans were materially increased. A considerable part of this increase was contributed by the type of can known as Sanitary, which was not made by this company on a commercial scale until recently, and the inclusion for the first time of the business of the Sanitary Can Company.

During the year new, capacious and modern factories have been built at Philadelphia and Toledo, replacing old or inadequate ones, and substantial additions have been built to a number of those operated at other points. Among improvements now being considered are two new factories on the Pacific coast to manufacture locally the goods that have been shipped from Eastern factories since the earthquake and fire of 1906; one at Chicago to replace a leased property; an additional warehouse at New Orleans, and re-arrangements of the American Stopper Company, Brooklyn branch.

This construction of new and extension and improvements of old factories and the increased working capital engaged in their operation require the use of a large amount of money, and though the statement herewith submitted shows the company free from other than current obligations and with a cash balance in excess thereof, attention is called to the fact that the statements made as of the last day of the year are made of conditions between active seasons, when inventories are lowest, accommodations to customers least needed and the capital in use small as compared with that absolutely necessary when stocks of materials, supplies and finished products are at their maximum.

While the foregoing seems sufficient, there are other reasons for conserving the cash or working capital of the company that should appeal to you. To hold its moderate proportion of business in the great variety of products manufactured it must have ready means for the improvement of facilities in occupied and extension in new fields where business justifies. A further consideration is the possibility of conditions arising which may make it imperative for the company to provide, wholly or in part, its own source of supply for its principal materials.

Safety Provisions in a Cincinnati Plant

A Number of Factory Management and Safety Measures in Vogue at the Works of the Cincinnati Planer Company at Oakley

Some schemes of factory operation and equipment, incorporating notably simple devices for safeguarding the lives of the employees, were recently observed in the Oakley (Cincinnati) plant of the Cincinnati Planer Company. For instance, in lifting heavy machine parts, having sharp edges, a one-quarter brass shoe, serrated on the inside to prevent slipping, is put over the sharp edge, and the lifting rope is looped over this shoe. A strictly enforced regulation in this connection is that when a rope shows broken strands or signs of ravelling it is taken outside and burned.

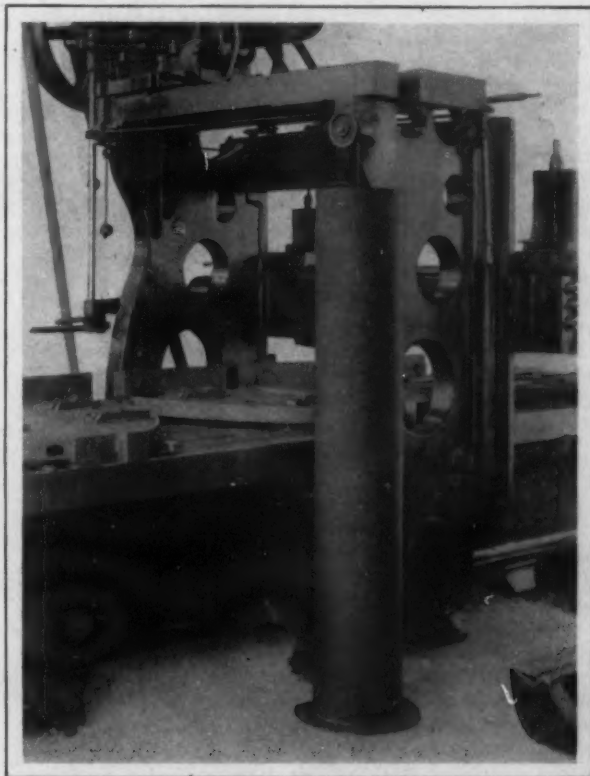
It has probably not occurred to the average person that a depressed loading track is not only an economical idea, but also a preventive of accidents. Heavy machinery does not have to be raised to the car floor level, frequently resulting in accidents from broken lifting chains or ropes.

In an accompanying illustration is shown a home-made guard for the gears of a screw-cutting machine. Another simple safeguard on this same machine is a long wooden box suspended over the bar or shaft being worked on, and easily lowered to cover the bar when revolving. This inexpensive appliance would doubtless prevent accidents in shops where work of this character extends beyond the machine itself.

The storing of pulleys by stacking them one on top of the other has been the source of accidents that can be prevented by a simple method the Cincinnati Planer Company has evolved. Into a cast-iron base a piece of pipe is screwed, having a smaller diameter than the hub of any pulleys kept in stock. Piled in this way there is no danger of their falling over on the workman.

Another view shows the cross-rail counterweights on a Cincinnati planer that travel inside a pipe of sufficient diameter for free movement. The base of this guard is attached to the floor. The arrangement is calculated to eliminate a great many accidents that have happened when the counterweights were allowed to swing loose.

Interchangeable portable guards are provided for the erecting pits. Main aisles are always open and no litter



Pipe Enclosure for Cross Rail Counterweights of a Planer

of any kind is allowed to accumulate in any part of the shop. The lighting arrangement of the company's factory, already described in *The Iron Age* is no small factor in the prevention of accidents.



Improvised Guard for Gears of Screw Cutting Machine

An Analysis of English Lathe Accidents

The February issue of the *Journal of Industrial Safety*, published by the Industrial Safety Association, 29 West Thirty-ninth street, New York, presents an array of interesting articles, among which is the following:

The gathering of statistics by labor inspectors and inspectors of factories is accumulating a vast store of interesting information. In England, for example, a very complete report has been published covering facts elicited on inspection and in reports in the northeastern division of the work of factory inspection.

The total number of accidents reported with lathes in the year 1910 was 670. The classification of the sources of these accidents and the numbers in each group are given in the following table:

| | |
|--|-----|
| From the driving belt of the lathe..... | 24 |
| From the cone-pulley, or belt of the lathe proper..... | 46 |
| From spindle gear and back gear..... | 17 |
| From the change wheels at the head-stock..... | 17 |
| From other gears in apron and feed mechanism..... | 8 |
| From the driving dog..... | 71 |
| From the face-plate or chuck..... | 23 |
| From projecting set screws about the lathe or work... | 8 |
| From the tool point or article being turned..... | 297 |
| From the flying chips, or articles being turned flying out | 127 |
| From other causes, including falls upon the workmen... | 32 |
| Total..... | 670 |

It is interesting to notice that nearly one-third of these accidents occurred in connection with the work being turned; next to these are the accidents incident to the dog or driver catching the arm or clothing of the workman and doubtless the chuck or face-plate accidents might be taken together, making up nearly 15 per cent. of the entire list.

Sheet and Tin Plate Tariff Briefs

The Present Status of These Industries as Stated by Independent Manufacturers, and Comparisons with Foreign Prices and Wages

About ten days before the Underwood bill to amend the metal schedule of the Payne-Aldrich tariff act was introduced in the House of Representatives a number of manufacturers of sheets and tin plates, apart from the American Sheet & Tin Plate Company, submitted briefs to the Ways and Means Committee. These apparently had no influence upon the committee, the inference being that the bill was at that time prepared and in substantially the shape in which it was reported to the House. The two briefs are given practically in full below, as published by the Steel and Metal Digest, though the Ways and Means Committee has thus far been unwilling to give out for publication any of the statements filed with it by manufacturers. The sheet steel brief, it is stated, is signed by 15 independent sheet companies. The tin plate brief, prepared by William U. Follansbee, is signed by him and by E. T. Weir, E. R. Crawford and Charles E. Pope. The statement of the sheet steel manufacturers is as follows:

The Sheet Steel Brief

In behalf of enormous capital invested, as well as of an army of 27,000 employees engaged in the sheet steel industry, drawing annually \$22,000,000 in wages, and who are to-day the best paid laborers in any branch of the great steel business, this brief is respectfully submitted. In behalf, further, of a large amount of capital invested, and also of that vast army of workmen who lay the foundation for the sheet steel industry by their labor in taking the ore from the mines, putting it through blast furnaces and making sheet bars from which sheet steel is made, and who for this labor receive annually in wages about \$11,000,000, this brief is largely filed. Together, these two great bodies of workmen, dependent for their employment on the prosperity of the sheet steel business, draw annually in wages in these United States \$33,000,000.

Any consideration of the tariff must ultimately look to these wage earners, for, more than in any other branch of the steel business, these workmen are skilled, as are their competitors across the water in Great Britain, of whom a large class has grown up; and there, as here, they are paid high wages as compared to other forms of labor.

In Great Britain and Europe, the sheet steel industry has developed a class of workmen which it is important to note, as their labor comes in competition with the American labor. Many women and children in these countries have learned this business, and their families have followed it for generations, and although their wages are on the average about 50 per cent less than the American wages, still they are better paid there than other forms of labor. This high skill and low wage must be borne in mind when the selling prices of the European and American product at seaboard points are compared, for, notwithstanding the long ocean carriage, with very low transportation charges, the low price of labor in Europe leaves the American competitor, with his high wages and relatively high transportation charges, little ground to stand on unless he is protected.

Coast Districts Exposed

From Maine to Houston, Tex., in 1910, there was a consumption of 114,573 net tons of galvanized sheets, estimated (not including a large production of black sheet steel now classified with heavy plates), to involve an expenditure of \$1,287,800 in direct wages to sheet steel employees for their production. This territory is all accessible to the English market by the low water rate of 10 cents per 100 lb. The freight rate from Pittsburgh to New York is 16 cents per 100 lb. Note the effect of this low water transportation rate, which is made to fluctuate to meet competition. English galvanized steel sheets to-day are selling at \$2.42 per 100 lb. f. o. b. port, No. 24 gauge; American at \$2.45, putting the English product into

New York at \$2.52 less duty, and the American at \$2.61. From the English price is deducted 1 and 4 per cent for cash by 10th of following month; from the American price, 2 per cent is deducted for cash in 10 days. In this connection it should be noted that these prices prevail to-day in an English market that is at a high point and very active, and in an American market that is very much depressed. This condition holds true all along the Atlantic Coast, as a glance at the list of freight rates from the Pittsburgh district attached to this brief will show.

The Pacific Coast discloses the same situation. The Pacific Coast consumed in 1910 about 36,844 net tons of galvanized sheets, estimated, meaning an expenditure of \$414,126 in wages paid to sheet steel employees for their production. These points are reached by an all-water rate from Liverpool of from 25 cents to 30 cents per 100 lb. or via the Tehuantepec Railway Company of 35 cents per 100 lb., while from Pittsburgh to that district the rate is 95 cents per 100 lb., making competition for both the Pacific and Atlantic Coast markets an impossible undertaking for the American manufacturer without substantial protection.

American and British Labor Cost

As the labor going into the making of steel sheets constitutes about 80 per cent. of their cost, it is well to compare the English labor wage with the American in specific instances, to bring out the great difference that exists in favor of the latter. For 24 gauge, rates per gross ton are:

| | American. | English. |
|--------------------------|-----------|----------|
| Roller | \$2.31 | \$1.14 |
| Heater | 1.76 | .84 |
| Doubler and matcher..... | 1.10 | .92 |
| Shearman | 1.01 | .40 |
| Catcher | .80 | .50 |

The only way in which these high American wages can be paid to-day, with the present selling prices being maintained, is by operating to full capacity and the institution of all possible economies; a curtailment of market will inevitably result in curtailment of wages even if present selling prices were not reduced.

Extent of the Sheet Industry

It should be borne in mind that the sheet steel industry has only reached its proportions to-day under the protective duty of 0.6 cent per pound of black sheets and 0.8 cent per pound of galvanized sheets. The development of this industry, it is apparent, would have been impossible under other conditions. The following table will show the extent to which this business has developed in the United States:

| | |
|---|--------------|
| Number of separate companies..... | 33 |
| Number of trains of rolls..... | 468 |
| Number of galvanizing pots..... | 129 |
| Number of employees..... | 27,000 |
| Annual pay roll..... | \$22,000,000 |
| Annual product of black sheets in 1910 (gross tons) | 1,435,620 |
| Tonnage of galvanized sheets included in above.. | 875,000 |
| Total capital invested in making sheet steel, not including furnaces and mills producing sheet bars (estimated) | \$35,000,000 |

The raw materials required to produce the above 1,435,620 gross tons of black sheets are:

| | |
|---|--------------|
| Sheet bars, gross tons..... | 1,725,000 |
| Pig iron, gross tons..... | 1,800,000 |
| Scrap, gross tons..... | 500,000 |
| Coke for the pig iron, net tons..... | 2,200,000 |
| Coke for coking..... | 3,600,000 |
| Limestone for pig iron, gross tons..... | 900,000 |
| Ore for pig iron, gross tons..... | 3,600,000 |
| Coal throughout processes, steam and heating, net tons..... | 3,700,000 |
| Spelter for galvanized sheets, net tons..... | 110,000 |
| Estimated value of spelter..... | \$14,000,000 |

The total estimated labor cost from iron ore in the ground to and including sheet bars is \$11,000,000; labor cost in sheet mills, \$22,000,000; total, \$33,000,000; estimated transportation charges on all above tonnage, \$17,500,000.

The ramifications of this great industry thus extend back until we have the grand total of \$33,000,000 of wages paid out in the course of a year to those whose employment is dependent upon its prosperity, and this exclusive of the immense benefit derived by our carriers from the revenues of \$17,500,000 which the industry brings to them.

By reference to the cost sheet hereto attached, it will be seen that the cost of sheet bars to-day is \$22.50 per gross ton, and that the total labor cost in turning bars into black sheets is \$11.24 per gross ton for No. 24 gauge. Other cost of manufacture, such as repairs, maintenance, sales, administration, etc., as shown in the cost sheet, make the total cost of black sheets, including the sheet bars, \$42.04 per gross ton, or \$1.87 per 100 lb. for No. 24 gauge.

The selling price of this commodity in New York to-day is \$1.91 per 100 lb., from which must be deducted 2 per cent. discount for payment in 10 days, which is generally taken advantage of. To the cost must be added the 16-cent per 100 lb. freight rate from Pittsburgh to New York.

Under these conditions, it is generally deemed best to keep plants running rather than to close them down in order that the organization may be kept together. Any impartial observer will see that the situation in this business to-day is one that cannot be trifled with, and every protection that can be extended to it should be given.

Appended Exhibits

The following exhibits are appended to the brief.

DUTIES AND OUTPUT.

Summary of import duty rates on iron and steel sheets, black and galvanized, No. 24 gauge, cents per pound:

| | Black. | Galvanized. |
|--|--------|-------------|
| Act of March 3, 1883..... | 1.2 | 1.9 |
| McKinley Bill, Oct. 1, 1890, effective July 1, 1891..... | 1.1 | 1.85 |
| Wilson Bill, Aug. 1, 1894..... | .8 | 1.05 |
| Dingley Bill, July 24, 1897..... | .8 | 1.00 |
| Payne-Aldrich Bill, August 5, 1909..... | .6 | .8 |

Production of iron and steel sheets, No. 13 and thinner in United States, gross tons:

| | |
|-----------|-----------|
| 1905..... | 983,437 |
| 1906..... | 1,074,525 |
| 1907..... | 1,084,700 |
| 1908..... | 864,900 |
| 1909..... | 1,248,404 |
| 1910..... | 1,435,619 |

THE WAGE ACCOUNT

Estimated amount paid in wages and salaries to men directly employed in the sheet steel industry in making steel sheets from sheet bars in the United States from 1905 to 1910:

| | |
|-----------|--------------|
| 1905..... | \$11,053,831 |
| 1906..... | 12,077,661 |
| 1907..... | 12,192,028 |
| 1908..... | 9,721,476 |
| 1909..... | 14,032,060 |
| 1910..... | 16,136,357 |

Estimated cost of labor employed from the time of mining the ore to the finishing of the (sheet) steel bar, from which the sheet is rolled:

| | |
|-----------|-------------|
| 1905..... | \$7,375,777 |
| 1906..... | 8,058,937 |
| 1907..... | 8,135,250 |
| 1908..... | 6,486,750 |
| 1909..... | 9,363,030 |
| 1910..... | 10,767,142 |

Differential in labor on tonnage basis on sheet mills, No. 24 gauge:

| | United States. | England. | Differential. |
|--------------------------|----------------|----------|---------------|
| Roller..... | \$2.31 | \$1.14 | \$1.17 |
| Rougher..... | .80 | * | .80 |
| Heater..... | 1.76 | .84 | .92 |
| Helper..... | .79 | * | .79 |
| Catcher..... | .80 | .50 | .30 |
| Doubler and matcher..... | 1.10 | .92 | .18 |
| Pair heater..... | .66 | * | .66 |
| Shearman..... | 1.01 | .40 | .61 |
| Totals..... | \$9.23 | \$3.80 | \$5.43 |

*No job; work done by the others, hence fewer men are employed.

COST OF PRODUCTION

Cost of producing No. 24 gauge black steel sheets, per gross ton:

| | |
|---|---------|
| Sheet bars, \$22.40 per gross ton, 2,632 lbs. (17½%)..... | \$26.32 |
| Credit, sheet scrap, 392 lbs..... | 1.88 |
| Net cost of material..... | \$24.44 |

| | Labor. | Charges. |
|--|---------|----------|
| Rolls..... | | \$.35 |
| Fuel, heating and annealing..... | | .70 |
| Superintendent, foremen and clerks..... | \$0.13 | |
| Tonnage labor..... | 6.97 | |
| Day hands, regular..... | 1.86 | |
| Extra day hands..... | .10 | |
| Unloading, shearing, weighing and delivering sheet bars..... | .26 | |
| Unloading coal and removing ashes..... | .04 | |
| Engineers and assistants..... | .07 | |
| Roll turning and polishing..... | .05 | |
| Changing and handling rolls..... | .01 | |
| Weighing and handling finished produce..... | .26 | |
| Crane operators..... | .03 | |
| Scrap boys..... | .20 | |
| Loading shearings and bar ends..... | .01 | |
| Cold rolling labor..... | .24 | |
| Annealing labor..... | .19 | |
| Re-shearing..... | .17 | |
| Bundling and stenciling..... | .09 | |
| Warehouse and shipping labor..... | .17 | |
| (Total producing labor)..... | \$10.85 | |
| Labor in repairs..... | .37 | |
| Labor in maintenance..... | .02 | |
| Materials in repairs..... | | .22 |
| Material in maintenance..... | | .02 |
| Annealing boxes..... | | .30 |
| Hot and cold neck grease..... | | .09 |
| All other lubricants..... | | .02 |
| Brasses..... | | .10 |
| General works expense..... | .83 | |
| Steam (including fuel)..... | .11 | .35 |
| Water..... | .02 | |
| Electric light and power..... | .05 | |
| General plant depreciation..... | | 1.00 |
| General expense (selling, taxes, insurance, interest, discount, etc.)..... | | 2.00 |
| Totals..... | \$12.25 | \$5.35 |

| | |
|----------------------------|---------|
| Net cost of material..... | \$24.44 |
| Labor cost..... | 12.25 |
| Other charges..... | 5.35 |
| Total cost 2,240 lbs..... | \$42.04 |
| Cost 100 lb. 24 gauge..... | \$1.87 |

FREIGHT RATES

Statement of freight rates from European points to United States points, per 100 lb.:

| | |
|---|------------|
| Liverpool to New York..... | 10c. |
| Liverpool to New Orleans..... | 11c. |
| Liverpool to Pacific Coast points, via Tehuantepec R. R. 35c. | |
| Liverpool to Pacific Coast points, all water..... | 25 to 30c. |

Freight rates from Pittsburgh, Pa., to other points, cents per 100 lb., carloads:

| | |
|-------------------------|------|
| New York..... | 16 |
| Troy, N. Y..... | 16 |
| Buffalo, N. Y..... | 11 |
| Syracuse, N. Y..... | 13½ |
| Philadelphia, Pa..... | 15 |
| Hartford, Conn..... | 18 |
| Boston, Mass..... | 18 |
| Providence, R. I..... | 18 |
| Portland, Me..... | 18 |
| Wilmington, Del..... | 15 |
| Trenton, N. J..... | 16 |
| San Francisco, Cal..... | 95 |
| Los Angeles, Cal..... | 95 |
| Portland, Ore..... | 95 |
| Seattle, Wash..... | 95 |
| Vancouver, B. C..... | 1.00 |
| Winnipeg, Man..... | 72 |
| Charleston, S. C..... | 27 |
| Birmingham, Ala..... | 45 |
| Nashville, Tenn..... | 30 |
| Jacksonville, Fla..... | 22 |
| Richmond, Va..... | 20 |

The Tin Plate Brief

Reference is respectfully requested to the verbal presentation November 25, 1908, by William U. Follansbee and to the brief by the independent tin plate manufacturers to the Committee on Ways and Means filed February 15, 1909. This present brief is based upon the same features as covered by the exhibits above referred to and is presented to outline conditions in the industry up to date including such changes as have occurred during the last three years.

| | Cent per lb. |
|------------------------------------|--------------|
| Present duty..... | 1.2 |
| Recommended reduction 16 2/3%..... | 0.2 |
| Suggested new duty..... | 1 |

Extent of the Industry

The consumption of tin plate, etc., continues to show a large growth to meet which many additional mills have been erected by independent manufacturers. These now total as follows:

| | |
|--------------------------|--------------|
| Number of companies..... | 15 |
| Aggregate capital..... | \$12,000,000 |
| Total mills..... | 157 |
| Capacity, tons..... | 500,000 |
| Capacity, boxes..... | 10,000,000 |
| Total employees..... | 11,000 |
| Annual pay rolls..... | \$7,500,000 |

This brief is presented upon behalf of the above interests.

The entire tin plate industry of this country now employs direct about 25,000 hands and produces about 800,000 tons, or 16,000,000 boxes, valued at \$52,000,000, requiring

| Tons. | Total labor including transportation. |
|---|--|
| 1,900,000 Ore | \$10,500,000 |
| 1,100,000 Coke | |
| 525,000 Limestone | |
| 1,000,000 Pig Iron | |
| 925,000 Steel | |
| 800,000 Tin Plate..... | \$17,250,000 |
| Total wages per annum paid American workmen dependent upon the tin plate industry, over 60 per cent of which, as shown, is paid direct in making the tin plate alone..... | \$27,750,000 |

In the last three years the production has increased 33½ per cent. and at the same time the cost to the consumer has been materially reduced.

The industry is exceptionally distributed, plants being located as follows: Maryland 1, Pennsylvania 18, Ohio 5, West Virginia 7, Indiana 3, Illinois 1.

The suggested new duty of 1 cent per pound is absolutely necessary to maintain the tin plate industry. This is required because of

1. Lower foreign labor.
2. Lower cost of foreign raw materials.
3. Smaller capital in foreign investment.
4. Freight costs from mills to consuming points.

(Of the above items there has been practically no change since 1909 in (1) and (3) and but slight change in (4). All are, however, given in the following detail to make this brief properly inclusive.)

1. Lower Foreign Labor

Standards of Comparison:

Skilled Labor in United States—Wage scales of Amalgamated Association of Iron, Steel and Tin Workers, and Tin Plate Workers' International Protective Association of America.

Skilled Labor in Wales—Wage scales of Tin Plate Section, Dock, Wharf, Riverside and General Workers' Union of Great Britain and Ireland.

General Labor in United States—As taken from the pay-rolls.

General Labor in Wales—Estimated at one-half the rates paid in United States. (Common labor in Wales is unquestionably less than the rate shown by this estimate.)

| | Per gross ton. | |
|------------------------|----------------|---------|
| | United States. | Wales. |
| Hot rolling..... | \$9.76 | \$4.555 |
| Opening | .425 | .305 |
| Pickling | .485 | .275 |
| Annealing | .87 | .666 |
| Cold rolling..... | .525 | .20 |
| General mill | 3.325 | 1.66 |
| White pickling | .375 | .278 |
| Tinning | 1.325 | 1.245 |
| Washing | 1.555 | 1.245 |
| Rising | .88 | .466 |
| Assorting | .52 | .415 |
| Boxing | .465 | .20 |
| General tin house..... | 2.44 | 1.22 |

\$22.95 — \$12.73 equals
\$10.22 per 2,240 lb., equals 45.6c per 100 lb.

2. Lower Foreign Raw Material

Particular attention is requested to showing in brief of February 15, 1909, as follows:

"Steel bars from which tin plate is rolled, present market prices as shown by trade quotations.

"Cost at mills in United States.....\$27.50

"Cost at mills in Wales.....21.50

"Difference per 2,000 lb., finished tin plate.....\$6.00 equals 30c per 100 lb."

The above average continued throughout 1909 and during the first half of 1910; thereafter and until the present time there has been a very decided change occasioned by the coincident depression and consequent shrinkage of values in iron and steel in this country, while exceptionally good conditions with much higher prices are ruling abroad so at the present time the cost of raw material differs but little in the United States and Wales. As, however, there has been this complete reversal within so short a period as about 18 months, and there is a decided hope for improvement in this country, while there are already indications the "boom" abroad has about run its course, and as

it can only be expected the cost of raw material in Wales, as a rule, will be much less than in this country, it would appear that at least one-half the former spread of \$6 per ton should be recognized and a reasonable average differential be allowed of \$3 per ton, equal to 15 cents per 100 lb.

(It is only because of the reversal of conditions as above recited that it is at all possible at this time to suggest the material reduction in duty proposed.)

3. Smaller Foreign Investment

The cost of plant in the United States is just about 50 per cent. greater. Cost of labor, as shown, nearly double. Raw material charges are higher. Interest charges are about double.

1. To produce 25,000 tons per annum requires capital investment:

| | United States. | Wales. |
|--|----------------|-----------|
| In plant..... | \$500,000 | \$333,333 |
| In labor, raw and finished material, acc'ts, receivable, etc..... | 500,000 | 250,000 |
| | \$1,000,000 | \$583,333 |
| | 583,333 | |

Greater in U. S.....\$416,667*

*At 6% equals \$25,000. Equivalent to per ton output \$1.00 equals 5 cents per 100 lb.

| | United States. | Wales. |
|--|----------------|----------|
| 2 Annual charges repairs, up-keep of plant and depreciation..... | \$50,000 | \$25,000 |
| Greater in United States, \$25,000, equals per ton output \$1 equals 5 cents per 100 lb., making 10 cents per 100 lb. | | |

4. Freight From Mills to Consuming Points

Fully two-thirds of the consumption of tin plate in the United States is at or near the seaboard, New York, Philadelphia, Boston, Baltimore, New Orleans, San Francisco, etc. The freights from mills in Pittsburgh district at shipping weight of 106 lb. including package as well as contents as required by the railroads are as follows:

| | Cents per 100 lb. |
|---|-------------------|
| To New York at freight rate of 16 cents equals..... | 17 |
| To New Orleans at freight rate of 32 cents equals.... | 34 |
| To San Francisco at freight rate of 66.2 cents equals | 70 |
| Average | 40 |

Freight from mills in Wales located at seaports varying from about 7 shillings 6 pence to 9 shillings 6 pence per 2,240 lb. of net contents, weight of package not included as permitted by steamship lines, to New York equals 8 to 10 cents per 100 lb. The through rates from Welsh ports to inland American points are proportionately much less.

A large portion of the tin plate consumption is seasonal and in regular sizes for which the requirements can be anticipated by many months, while the size and character of boxes of tin plates make it particularly desirable for ballast thus permitting as low water freight cost from Wales to New Orleans and San Francisco as to New York, accordingly the freight item from mills to consuming point is very important and may show as high as 60 cents per 100 lb. differential in favor of Wales, and which may be further increased by the operation of the Panama Canal. With any spirit of fairness to American mills it would appear this factor should not be considered at any less than the average from American mills to seaboard points, as shown above, of 40 cents per 100 lb.

RECAPITULATION.

| | Cents per 100 lb. |
|---|----------------------|
| 1. Lower foreign labor..... | 45.6 |
| 2. Lower cost foreign raw materials..... | 15. |
| 3. Smaller capital foreign investment..... | 10. |
| 4. Freight costs from mills to consuming points, average | 40. |
| | \$1.106 |
| Equivalent to cents per lb..... | 1.10 |

History of Tin Plate Tariff

The suggested new duty of 1 cent per lb. while preserving to the American industry a reasonable proportion of this growing trade is by no means prohibitive; should show regularly a fair volume of revenue producing importations and insure a low price to the consumer.

The establishment of the American tin plate industry under a reasonable tariff most emphatically has not increased the cost to the domestic consumer, but, on the con-

trary, has unquestionably reduced the price, as shown below:

| | | Welsh Tin Plate Duty Added. | |
|---------------|-------------------------------|-----------------------------|-----------------|
| | | 1872-1878 | 1879-1891 |
| Duty |15 per cent. ad valorem. | 1 cent per lb. | 1 cent per lb. |
| Average price | ..... | \$7.30 | \$4.81 |
| | | American Tin Plate. | |
| | | 1904-1908 | 1909-1911 |
| Duty |1.5 ct. per lb. | 1.2 ct. per lb. | 1.2 ct. per lb. |
| Average price | ..... | \$3.48 | \$3.38* |

*During the period 1909-1911 the price of block tin, all of which is imported free of duty, largely used in the manufacture of tin plate has averaged two (2) cents per lb. higher than for the period 1904-1908. Were it not for this factor the average price for 1909-1911 would have been reduced to \$3.34.

Summary of Import Duty Rates on Tin Plate

1864-25 per cent. ad valorem. No American manufacture.

1872-15 per cent. ad valorem. No American manufacture.

1875-1.1 cent per lb. American manufacture attempted in several plants resulting in large losses and financial failures; manufacture abandoned.

1883-1 cent per lb. No American manufacture.

1890-effective July 1, 1891-2.2 cents per lb. Many mills built and a rapidly growing industry developed.

1894-1.2 cents per lb. Growth halted, mills shut down, strikes, labor reductions, etc.

1897-1.5 cents per lb. Industry revived, many new mills built. Employment given to thousands additional workmen. Prices greatly reduced.

1909-1.2 cents per lb. Phenomenal growth in the industry. Capacity greatly increased. Prices further reduced and consumption increased 331-3 per cent. and in 1911 amounted to 800,000 tons as compared with 329,000 tons in 1890 prior to beginning of manufacture in United States.

Drawback Regulations

These permit refund of 99 per cent of duty on importations for manufacture in the United States when such manufacture shall be exported. Under them the importations of tin plate for the years 1909, 1910 and 1911 (last 5 months 1911 estimated) have averaged 51,078 tons per annum but have yielded no revenue, as it has doubtless cost more than the 1 per cent of duty retained to collect same.

It would appear to reduce the drawback from 99 per cent to not more than 50 per cent should not stop these importations and would at the same time produce a large item of revenue. This would not work injury to home industries as the tin plate so imported is used almost entirely for containers which represented but a small fractional value of the contents.

The drawback paid on tin plate is more than on any other imported commodity and for the years 1899 to 1910 inclusive has averaged 35 per cent of the total drawback paid on all other commodities.

Pacific Coast Importations

The statistics of the Department of Commerce and Labor show the following:

Year ending June 30, 1909 (duty 1.5 cents per lb.), 386,010 lb.

Year ending June 30, 1911 (duty 1.2 cents per lb.), 6,691,616 lb.

As the reduction of duty from 1.5 to 1.2 cents per lb. has multiplied these importations nearly 18 times, it should be expected the further reduction of duty to the suggested 1 cent per lb. will still further greatly increase these importations and provide additional revenue.

High Labor Costs

From the beginning of the American manufacture of tin plate strenuous efforts have been made to reduce the labor cost by the substitution of machinery for men, and hundreds of thousands of dollars have been spent in this endeavor, which, however, has been successful only to the extent of heavier mills with somewhat increased output. The physical peculiarity of the manufacture of tin plate compels employment of labor to a very exceptional degree and necessitates a much larger proportion of labor cost than for any other manufacture of iron or steel.

A Great Growth

The marvelous growth in consumption of tin plate from about 300,000 tons in 1890 to 800,000 tons in 1911 has unquestionably been largely stimulated by the reduced prices following the competition of American mills. Were this

country dependent upon Wales it is doubtful if this greatly increased tonnage could have been obtained and were that possible it certainly would only have been at greatly advanced prices.

While the industry in general has been fairly prosperous, the productive capacity has increased even more rapidly than consumption and competition has been exceedingly keen, resulting in frequent shut downs of some plants and the failure of several.

The American tin plate industry is the youngest in the iron and steel line. It has only been established by much travail. It has been exceptionally adversely treated by former tariffs. It is the item by far most greatly influenced by labor and the peculiarity of greatest consumption at seaboard points. Although begun only twenty years ago under the McKinley tariff of 2.2 cents per lb. the suggested new duty of 1 cent shows a reduction of 55 per cent. Any lower duty would entail great hardships upon American labor and capital and tend to cripple the industry.

The Warwick Iron & Steel Company's Report

The Warwick Iron & Steel Company has issued its annual report for the year ending December 31. It shows the net earnings for the year to have been \$125,564.29. The dividends paid during the year totaled \$119,972.80. The surplus January 1, 1912, was \$1,244,098.37. The statement accompanying the financial exhibit is signed by President Edgar S. Cook, Vice-President Philip Doerr and the directors, and is in part as follows:

Business conditions during the year 1911 were poor, and gradually grew worse. The average selling price of iron declined, particularly in the last three months, so that the orders on our books December 31 were \$1.36 per ton lower than orders on the books January 1. The cost of iron could not be materially reduced, and therefore the net profit per ton of iron made is less than in the year 1910. For the year our total product was 197,058.05 tons.

On June 1 bonds amounting to \$180,000 were paid and cancelled. At the same time we reduced our outstanding bank loans to the extent of \$120,000. This was accomplished by the issuing of \$300,000 6 per cent. gold notes, due June 1, 1914. The furnace plant, therefore, is now free from all mortgage encumbrance. The construction of furnace stack A is practically completed, and will be ready for use as an alternate stack whenever needed.

The lease, with option of purchase, of the plant to the Eastern Steel Company, as unanimously ratified at the stockholders' special meeting, held January 16, is now in effect. The transfer was made as of January 1. The consummation of this lease practically assures an 8 per cent. dividend and a cash valuation for the stock of \$13.33.

California Metal Trades Association

The California Metal Trades Association, at its annual meeting in San Francisco January 24, elected the following officers, all of San Francisco: President, Sam J. Eva, United Engineering Works; first vice-president, Constant Meese, Meese & Gottfried Company; second vice-president, John Hedley, Western Foundry. Executive Committee—G. A. DuBois, Byron-Jackson Iron Works; C. H. Evans, C. H. Evans & Co.; O. H. Fischer, Union Gas Engine Company; S. S. Herrick, Vulcan Iron Works; Andrew L. Kerr, Steiger & Kerr Stove & Foundry Company; John A. McGregor, Union Iron Works Company; P. H. Reardon, Compressed Air Machinery Company; John T. Scott, Moore & Scott Iron Works.

The keynote of President Eva's address on this occasion was, "We will not stand for anything which discriminates against our city." He gave in full detail an account of conditions at present existing in relation to the San Francisco work day. It had been expected that by November 9 a decision would have been rendered by the Conciliation Board as to whether the eight-hour day should continue to be enforced in San Francisco or not. This board, however, has been unable to arrive at a decision because of the absence of some of its neighbors and therefore the eight-hour day is temporarily continued. Meanwhile their competitors in other coast cities are working eight hours per day.

S. DIESCHER & SONS.

**Mechanical and Civil Engineers,
PITTSBURGH, PA.**

Rolling Small Iron Products

Process Used in Germany for Making a Variety of Articles in a Rolling Mill Instead of Employing Drop Forges or Presses

BY DR. ALFRED GRADENWITZ

If means could be devised for adapting the rolling mill to the manufacture of small iron articles, many advantages would doubtless be obtained, the direction of fibers being mostly preserved in the direction of stress, whereas in the case of punching or pressing, according to the present practice, the structure is destroyed as regards this feature. Moreover, the absence of vibrations due to the absolute smoothness in the working of rolling mills would reduce the weight of foundations, while the incomparably greater output would insure a considerable saving in unit labor cost as compared with the use of steam hammers or presses.

In spite of numerous attempts made in this direction from time to time, most of the schemes so far suggested never got beyond an experimental stage, while only in some exceptional cases, viz., in connection with some special articles of identical shape on both sides, have rolling mills been used.

The new scheme described in the following has aroused more than ordinary interest in German engineering circles. This patented rolling process in fact enables widely varying pieces, which have so far been made by forging or pressing, to be manufactured in a rolling mill. Among the objects so far made in this way may be mentioned the following: Screw wrenches, door keys, grate-bar points, horseshoe caulks, cultivator blades, plantation knives, plough shares, etc. The output obtained in this connection is considerably higher than with hammers or presses, reaching in many cases ten to twenty fold.

As seen from Fig. 1, the new rolling mill comprises an upper roll driven in a constant direction of rotation. At each revolution it carries along by means of toothed segments, a lower

(e. g., spades and crossed-fencing points). In connection with small-size articles, several molds are arranged in the same matrix behind or beside one another, thus greatly increasing the output of the plant.

An ingenious arrangement, Fig. 3, is adopted in connection with goods of specially lengthy shape; the lower cylindrical roll of the rolling mill is replaced by a table sliding on the base plate. This is likewise taken along by the upper roll during the rolling operation, in order afterward to be pulled back by a counter-weight into its initial position. The lower rolling mold thus lies horizontal during the time the upper roll runs light, allowing the blank to be inserted into the matrix in the proper position. The rolled article also is kept quite straight by this arrangement.

As in most cases the articles are to be shaped in the direction of the fibers of the rolled bar, the energy expended in this connection is far less than in connection with steam-hammers or presses. Of the three rolling mill types so far designed according to this system, the smallest takes up 4 hp., the medium type 5 to 6 hp., and the largest type 15 to 20 hp.

The rolling pressure being intermediate between 70,000 and 185,000 lb. For a similar output steam-hammer operation would entail a consumption of energy at least three times these figures. Apart from the advantages above enumerated, it should be remembered that the matrices in the new rolling mill are far from being exposed to the same stress as when placed under steam-hammers, which has been found to result in a considerable saving of energy.

Fig. 4 represents the various stages of an iron bar before and after rolling, and the finished product after punching. The process, which was invented

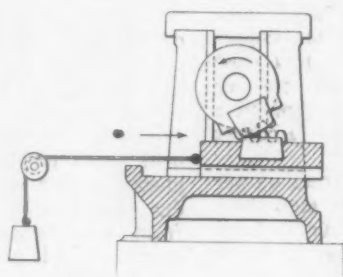


Fig. 3—Mill for Specially Long Shapes

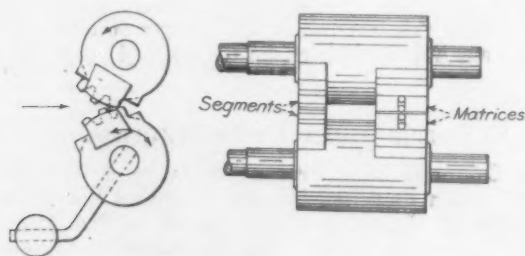


Fig. 1—General Features of the Rolling Mill

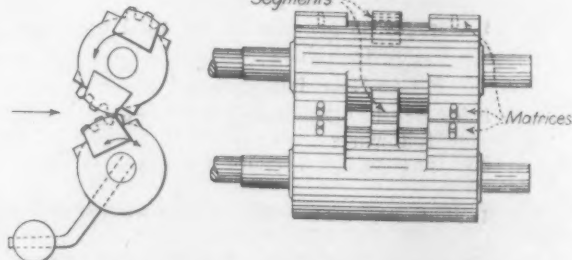


Fig. 2—Rolling Mill for Products Requiring Two Strokes

roll swinging back later into its initial position. These two rolls carry matrix molds with engraved rolling surfaces. Owing to the positive connection effected by the toothed segments, the two rolling surfaces are kept invariably in the proper relative position. As soon as the rolling work has been completed, the toothed segments get out of gear and the lower roll is drawn back into its initial position by a pneumatic return brake or an electromagnet. The rolled sample is disengaged, while the matrix molds are cleaned and cooled by an automatically controlled water jet.

The upper (or driving) roll generally performs only 8 r.p.m., thus allowing a stroke to be readily made with each revolution. In order to roll from the same iron bar twice in succession, the upper roll is provided with two matrix molds of the same gauge, set 180 deg. apart. The upper roll then carries along the lower one twice during each revolution. The rolling mill can also be designed with two matrices situated beside one another, mainly in connection with articles otherwise requiring two strokes

by A. Schumacher, is in use in an iron works at Gevelsberg, near Cologne, Germany.

The Pneumatic Cupola Company, Ironton, Ohio, has been incorporated with a capital stock of \$50,000 to exploit the patents covering a process by which it is claimed that fine, non-porous castings can be produced at a reduced cost. It is stated that it is in successful use in Sheffield, England. It is claimed that tests show an increase of 25 per cent. in tensile strength over the ordinary process, besides a large saving in the cost of production. L. P. Hoult is secretary-treasurer of the company, which has established an office and demonstrating plant at 103 N. Second street.

The Sloss-Sheffield Steel & Iron Company, Birmingham, Ala., which blew out its No. 1 City furnace recently because of an accident, blew in its No. 2 City furnace, which had been under repair for some time, on January 31.

A Proposed Accelerated Corrosion Test

BY WM. D. MAINWARING.

There seems to be a doubt in the iron and steel trade, particularly in the branch intimately connected with roofing materials, as to the true value of the sulphuric acid accelerated corrosion test. It also appears that the manufacturers of the various products, i. e., puddled iron, open hearth pure iron and the steel sheets, interpret the results obtained by its use as favorable to their particular product and detrimental to their competitors, as the case may be, whereas, under practical working conditions, one may be as good as another.

It would seem that more doubt is cast on the value of this test if the action of the various acids used in the laboratory is noted and the various compositions of the materials. Bessemer steel, with its higher degree of impurity, will dissolve faster in dilute sulphuric or hydrochloric acid than the open hearth steel of lower impurity; the higher carbon Bessemer steel more rapidly than the lower carbon Bessemer, and the higher carbon open hearth steel more rapidly than the lower carbon of this class; that therefore the pure irons made in the open hearth furnace will dissolve slower than the more impure steel or wrought iron.

It is with the idea of having some method that can be used as standard that the apparatus suggested in the accompanying diagram is given. It will be seen to consist of a tall, glass, cylindrical chamber with a tubulature near the

It would appear that, to use the test to advantage, an analysis of the atmospheric conditions at the locality where the material is used should be made. By increasing the volumes of the corroding gases in proportion to the pure air used, an accelerated corrosion test could be carried on. If a quantitative result could be obtained, it would be possible to predict to a nicety the life of the sheet steel or iron in any particular exposure.

No work has been done on the apparatus at present, but, in view of the importance of the question of corrosion, it was deemed to be sufficiently interesting to submit the proposition at this time, and the author hopes that it will cause some discussion as to its possible merits or demerits out of which a really valuable method may be evolved; also, that some standard to be used as unity may be suggested where-

by quantitative results may be satisfactorily obtained.

The author will be pleased to receive small samples of the various roofing sheets in order to try out, as far as possible, the above suggested scheme.

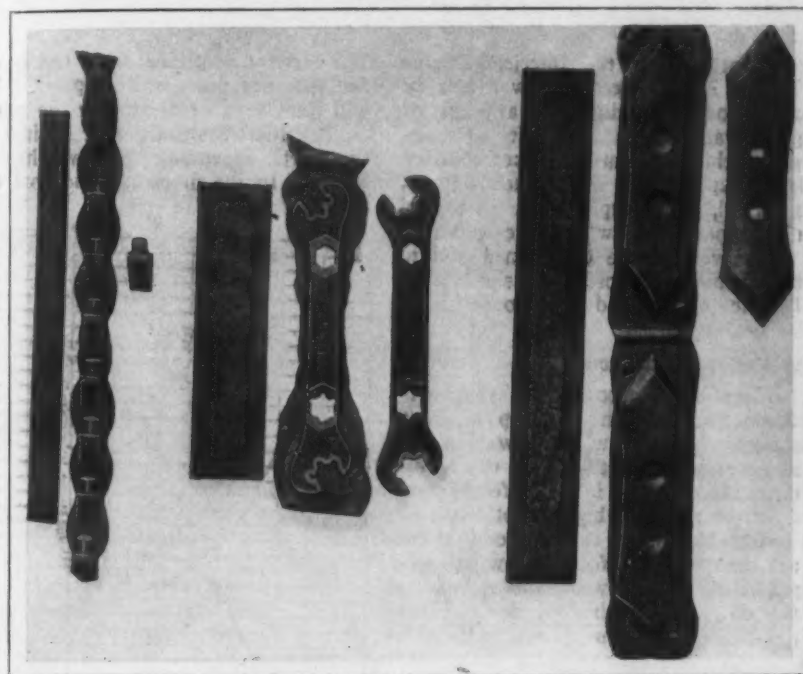


Fig. 4—Various Stages of an Iron Bar Before and After Rolling

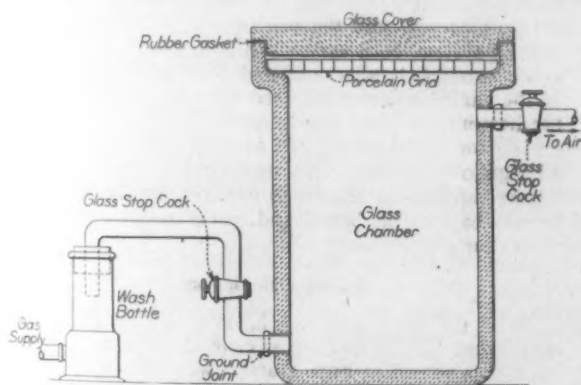
Lock for Nuts and Bolts

An improved type of nut lock is being manufactured by the Universal Nut & Bolt Lock Company, Newport, Ky., for street car trucks and on railroads. Two types of lock are made, one which is that illustrated is intended for use where the surfaces in contact are both metal, while another of slightly different construction is supplied for use against wood.

The material employed for the lock is open-hearth strip steel, which is rolled to conform to the dimensions of the different sizes. This is pickled and oiled before it leaves the mill so that the dies used to punch out the various parts will not be damaged. After the parts are punched out they are put in the tumbling barrel to remove the rough edges. The next step in the manufacturing process is to run the pieces through a set of special dies where sharp points are put on the ring and the welding points on the lip piece.

The ring is case hardened by a new process employing gas which is said to give uniform hardening without any guess work. When the case hardening operation is completed the pieces go to an automatic electric welding machine which has been especially designed to handle this class of work. The capacity of this machine is very large, and thousands of these locks are turned out each day.

These locks are made in a number of sizes from 3/16 in. and upward, and can be easily applied and removed. To place the lock on the bolt the nut is removed and the lock is substituted for the washer with the smooth side next to the nut. The nut is then tightened until the four projecting points on the opposite side penetrate the metal, after which the projecting lip is bent up against the nut.



Apparatus for Subjecting Metal to Corrosive Atmospheres

top and bottom (of suitable size so that several samples of steel or iron can be tested at once) connected, by means of a glass tubing, to two wash bottles. The acid vapors generated on heating hydrochloric or sulphuric acid or the compressed sulphurous and carbonic acid gases could be passed through the apparatus either concentrated or diluted with air to a predetermined composition in either a dry state or moistened with water contained in the wash bottles. The smoke produced by furnaces and locomotives could be collected and also passed through the apparatus; in fact, any combination of gases could be made and their action noted on the weighed samples contained in the glass chamber.



A New Lock for Nuts and Bolts Made by the Universal Nut & Bolt Lock Company, Newport, Ky.

Cost of Power Generated in Isolated Plants

Analysis of the Cost of Generation by Non-Condensing Engines Where the Exhaust Steam Is Used for Heating During the Winter Season

According to a report prepared by the American Engine Company, Bound Brook, N. J., electric power can be generated as a by-product of the heating plant at a cost of less than 2 cents per kilowatt-hour in a majority of cases. The factors entering into this figure are the fixed charges, the coal cost, the labor expense and miscellaneous items, such as the charges for oil, waste, repairs, etc. A typical case is presented in the report as showing the calculations by which the cost of power can be determined and to point out the influence of the three most important factors, the fixed charges, the price of coal and the amount of exhaust steam used for heating.

The Various Cost Factors

An industrial plant operating 3000 hr. per year with an average load of 200 kw. is taken as a typical plant. To generate this amount of power two 100-kw. and one 50-kw. engine-driven generators, together with the necessary piping and appurtenances, can be installed for \$11,000. Two 200-hp. boilers will be required, but the total cost of these boilers is not chargeable against the total cost of the power, since they are also required for the low-pressure heating plant. The cost per horsepower of low-pressure boilers, grates, stacks, etc., is approximately the same as that of a similar high-pressure equipment, but as heat is lost and consumed between the high-pressure boiler and the heating system a somewhat larger boiler capacity must be installed where power is to be generated, and 25 per cent. additional capacity is usually sufficient to take care of this item, as the engine exhaust contains from 80 to 90 per cent. of the heat given to it in the boiler. On the basis of \$18.75 per horsepower, which figure includes the cost of the boiler, the grates, the setting of the stack, the piping and the labor of installation, the additional boiler cost is \$1,500. This figure will, however, vary, and it is emphasized that in plants already equipped with low-pressure boilers, it will pay to replace the equipment with high-pressure boilers and utilize the exhaust steam for heating. The effect of increasing the fixed charges on the boiler plant equipment in this way will be demonstrated in connection with the two accompanying charts. It might be possible to install other apparatus, such as a feed water heater in a plant of this character, but as this appliance should pay for itself out of the coal saved by its use, it is not proper to consider it as one of the items of additional first cost.

The fixed charges, consisting of interest, depreciation and insurance, real estate, upkeep and obsolescence, are

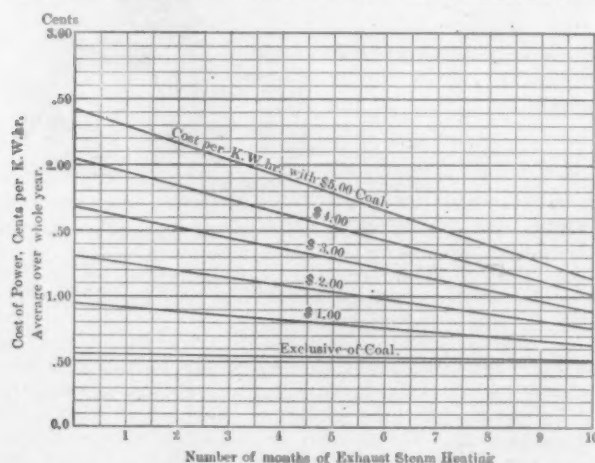


Fig. 1—Chart Showing the Cost of Power per Kw-Hour for Various Prices of Coal and Periods of Heating with Exhaust Steam

figured at 5 per cent. on the investment for each, or a total of 15 per cent. Upon this basis the fixed charge per year against the additional investment for apparatus to generate power as a by-product of the heating system is \$1,875.

The cost for additional labor can be considered as one man for \$800 per year, while repairs, oil, waste, packing, etc., will total \$250, or \$1,050 for the miscellaneous items.

The fuel cost chargeable against power is divided into two parts, depending upon whether heating is being done or not. In the first case, the coal equivalent of the heat

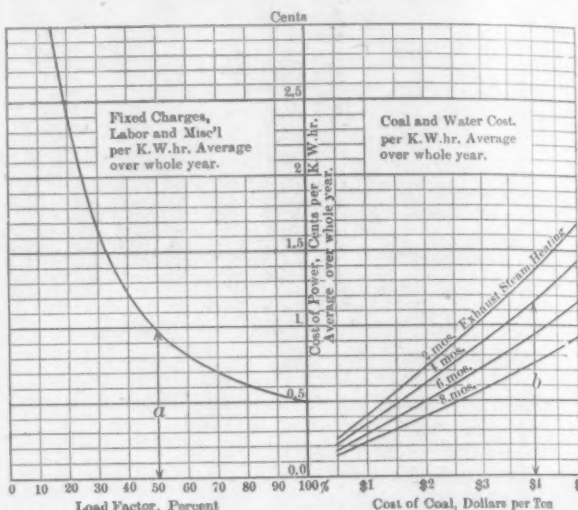


Fig. 2—Average Yearly Coal and Water and Fixed Charges Costs per Kw-Hour

lost between the high-pressure boiler and the heating system should be charged, while when no heating is being done all of the coal burned under the boiler is chargeable. The coal cost depends upon the steam consumption of the engine, the number of pounds of steam generated per pound of coal, the cost of the coal and the percentage of the total amount of steam generated which is used by the heating system. In this particular plant the steam consumption was assumed at 60 lb. per kilowatt-hour and the boiler efficiency was figured at 60 per cent., or about 8 lb. of steam per pound of coal. The other two items, the cost of coal and the proportion of steam used by the heating system, both vary. While heat will be required for seven months it was assumed that as the full exhaust of the engine was not required for more than four months the heating load was equivalent to the full exhaust of the engine for 5½ months. An average price of 10 cents per 1000 gallons of water was used, and it was assumed that during the heating season 80 per cent. of the water found its way back to the boiler, and that during the other period it was an entire loss.

Cost Calculations

With the fixed cost and labor cost already given, and calculating the coal and water charges for given conditions, the charts shown in Figs. 1 and 2 were obtained. The following example shows in detail the method of obtaining the figures used: Assume the heating season equivalent to six months of full load steam heating, during which all the exhaust is used, the coal chargeable against power during this period is the equivalent of the steam and heat lost between the high-pressure boiler and the heating system, which was figured at 20 per cent. The other factors entering into the coal cost were, load, 200 kw. steam consumption, 16 lb. per kw.-hour; coal consumption, 1 lb. of coal per 8 lb. of steam, and time of operation 3000 hr. Upon this basis, with coal at \$4 per ton, the cost of coal during the heating period is \$900, while during the other portion of the year when there is no exhaust steam heating, the cost of coal is \$4,500. Additional charges of \$43.20 and \$216 for the water used during the heating and the non-heating period respectively, must also be added.

The total cost for generating power at the rate of 200 kw. for 3000 hr. per year, is as follows:

Total Cost of Power Generation.

| | |
|--|---------|
| Fixed charges | \$1,875 |
| Miscellaneous items | 1,050 |
| Cost of fuel, non-heating period..... | 4,500 |
| Cost of coal, heating period..... | 900 |
| Cost of water, non-heating period..... | 216 |
| Cost of water, heating period..... | 43 |
| Total..... | \$8,584 |

Dividing this figure by 600,000, the total number of kw.-hours in a year, the cost per unit is found to be 1.421 cents. When the heating season is equivalent to only two months of full load heating, the cost per kw.-hour is increased to 1.85 cents, and if the price of coal is \$5 instead of \$4 the cost of power is 2.175 cents.

Explanations of the Charts

The charts reproduced in Figs. 1 and 2 were prepared from these data. In the first chart the power cost in cents is plotted as the ordinate, while the number of months during which steam is used for heating is the abscissae and the slanting lines represent different prices of coal. With this chart it is possible to study the influences of coal cost, first cost, length of heating and the percentage of initial cost which should be charged over each year, to take care of interest, depreciation, etc.

An example of the use of this chart would be to find out the cost of power in a plant where a low-pressure boiler has been installed and must be replaced instead of considering the cost of a high-pressure boiler plant and an engine as compared with a low-pressure boiler plant. An entire new boiler costing five times the amount of the additional capacity required in the other case, or \$7,500, would be needed. This would increase the additional first cost of the plant by \$6,000 and the annual charges by 15 per cent. of that amount, or \$900, making the total fixed charges \$2,775. This would increase the fixed charge per kilowatt-hour, from 0.312 cents to 0.462 cents, and the influence of this additional charge of 0.15 cents on the cost of power with coal at \$4 per ton and exhaust heating used for three months would result in an increase in the cost of power from 1.75 cents to 1.90 cents per kilowatt-hour.

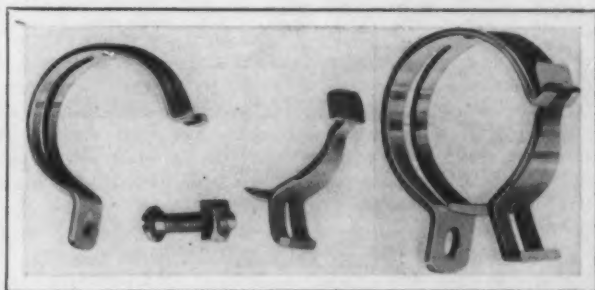
In the chart reproduced in Fig. 2 the cost per kilowatt-hour is plotted against the cost of coal in dollars per ton, and each line represents the cost for different lengths of heating periods. This chart is useful for investigating the effect of the price of coal and comparative effect of the length of heating season and the price of coal. For example, an inspection of this chart shows that the cost per kilowatt-hour is practically the same for an eight-month solid heating season with coal at \$4 per ton as it is with a two-month heating season with coal selling for half that amount. Referring to this chart, it will also be noticed that the cost, exclusive of coal and water, is considered separately, being plotted against the load factor. In plotting these curves a load of 200 kw. for 3000 hr. per year was considered as a 100 per cent. load factor, although the capacity of the plant was 50 kw. more. With a load factor of 100 per cent. the fixed charges, labor charge, etc., were 0.488 cents per kilowatt-hour, while at a 50 per cent. load factor, the cost exclusive of coal and water, was 0.976 cents. The complete curve was plotted from the results of similar calculations and can be used in connection with the curves at the right of the chart to study the power under various conditions. If, for instance, the load factor is 50 per cent., then the ordinate a equals 0.98 cent. which represents the fixed and labor charges, etc. If the cost of coal is \$4 a ton and the number of months during which exhaust steam heating is employed is four, then the coal and water cost per kilowatt-hour is given by b , which equals 1.17 cents and the total cost of power, which, in the sum of these two figures, is 2.15 cents.

The trust buster is sadly needed in Germany. The Berlin Lokalanzeiger learns that the Prussian Government, which is a large colliery owner, has come to an agreement with the Coal syndicate, which renders it certain that the Government will join the syndicate, though whether it will become an ordinary member or will simply turn over its production of about 10,000,000 tons annually to the syndicate is not known.

An Improved Hose Clamp

A hose clamp possessing the advantages of strength, indestructibility, ease of application and removal and low cost is being made by the Thompson Mfg. Company, Newark, Ohio. In use the free end of the longer section of the clamp is drawn snugly around the hose, an arrangement which it is emphasized insures a good contact. The opening in the clamp is large enough to permit the clamp to slip over the hose below that part expanded by the fitting freely without bending the clamp. This insures the indestructibility of the clamp, and as the clamps are not distorted in removing them from old hose but retain their original shape, it is thus possible to use them over and over again. Views showing the clamp as it appears when applied to the hose and also when separated into its parts are given in the accompanying engraving.

As will be noticed from the view at the right of the engraving where the clamp is shown unassembled, the device consists of two segments and a locking bolt. The two circular portions are made from sheet metal, the one at the right being bent to an approximate semicircle, while its length is slightly greater. This piece has a radial ear with an opening through which the locking bolt passes while a narrow longitudinal slot extends from this ear to the portion of the clamp opposite the locking bolt. There is a narrow cross piece at the end of this slot which separates it from the other slot at the opposite end of the piece. The first of these slots is designed to reduce the weight of the clamp and increase its flexibility, while the other forms a portion of the locking device. The outer end of the sides of the slot are turned back to form two



Assembled and Unassembled Views of an Improved Hose Clamp, Made by the Thompson Mfg. Company, Newark, Ohio

parallel hooks. The other member is formed with a tapered shank which corresponds at its inner end in width with the distance between the two hooks of the longer member. The inner end of this shank is bent slightly outward and has an enlarged end or head.

In use this shank fits between the hooks and the head rests against the outer surface of the other part. The object in offsetting the shank is to have it form a continuation of the arc of the other member and not project into the slot for any great distance, while at the same time it is pointed out that this arrangement results in the attaching and detaching of the two parts easily. The other end of this member has a radial ear with a longitudinal slot in which the locking bolt rests. A flange at the end of this ear engages with the nut on the bolt and prevents it from turning when the bolt is tightened by a screw driver. As the two parts are brought together by the bolt a wedge-shaped tongue on the shorter piece enters the slot in the long member and slides through until the bolt has been tightened. The tightening of the bolt causes the tongue to be forced against the periphery of the hose and clamp it securely. When it is desired to remove the clamp the bolt is loosened and the nut unscrewed. Pressing downward on the short portion of the clamp disengages it from the hooks in the other part so that the two parts can be separated without damaging the hose or themselves.

The Dayton Steel Construction Company, Dayton, Ohio, has let contracts for a new building, but will supply the steel frame work. It expects to occupy the new building about June 1 and will use the equipment and machinery in its present plant and some additional equipment already purchased. The total cost of the new plant will be about \$25,000. R. S. Shonk is president.

Iron and Steel Metallurgy in Brief

A Summation of the Processes Which Result in Various Descriptions of Product from Iron Ore to Finished Forms

The following summary statement, which indicates the line of processes involved in the manufacture of iron and steel, beginning with iron ore and ending with the various forms of finished products, has been compiled by Eliot A. Kebler, 1844 Oliver Bldg., Pittsburgh, resident agent of M. A. Hanna & Co. With it are given chemical analyses of iron ore, pig iron, semi-finished steel and finished materials, including the products of iron and steel foundries:

From Ore to Finished Product

| | | |
|---------------------|---|--------------------|
| Iron Ore | Contains Iron and Oxygen and impurities. | |
| Iron Ore | Smelted in <i>Blast Furnace</i> , removing Oxygen and part of impurities and adding Carbon, makes | Pig Iron |
| Foundry Pig Iron | Melted in <i>Cupola</i> and cast makes | Iron Castings |
| Iron Castings | Made from Malleable Pig Iron and heated in <i>Scale</i> , make | Malleable Castings |
| Grey/Forge Pig Iron | Melted in a <i>Puddling Furnace</i> , then balled, squeezed and rolled, makes | Muck Bar |
| Muck Bar | or Wrought Scrap cut into short lengths, piled, heated and rolled, makes | Wrought Iron |
| Muck Bar | Treated as above and rolled into strips, makes | Skelp Iron |
| Skelp Iron | Bent into the shape of tubes and welded, makes | Iron Pipe |
| Muck Bar | Or Steel melted in a <i>Crucible</i> with Charcoal, makes <i>Carbon Steel</i> , <i>Tool Steel</i> or | Crucible Steel |
| Muck Bar | Or <i>Steel</i> treated as above, with Tungsten added to raise the temperature at which it softens, Chromium to give toughness, and Vanadium, Titanium, Aluminum or other metals to improve the quality, heated to a high, then to a lower heat makes | High Speed Steel |
| Bessemer Pig Iron | Direct from <i>Blast Furnace</i> or melted in <i>Cupola</i> , poured into <i>Converter</i> , with air blown through it to burn out the impurities makes | Bessemer Steel |
| Pig Iron | Molten, or in pig, with or without Scrap, when purified in <i>Open Hearth Furnace</i> makes | Open Hearth Steel |
| Low Phos. Pig Iron | Treated as above in an acid (Silica or Sand) lined furnace makes | Acid O. H. Steel |
| Basic Pig Iron | Treated as above in a basic (Dolomite) lined furnace to remove Phosphorus makes | Basic O. H. Steel |
| Basic O. H. Steel | With only about 1-10 of 1% impurities is called by various trade names, such as <i>Toncan Metal</i> , <i>Genuine Open Hearth Iron</i> and <i>American Ingot Iron</i> . | |
| Vanadium Steel | Or <i>Manganese</i> (over 7%), <i>Titanium</i> or <i>Nickel Steel</i> is made by the addition of these metals, all being called. | Alloy Steels |
| Steel | Purified in an <i>Electric Furnace</i> , makes | High Grade Steel |
| Steel | Is cast into ingot molds usually about 19 in. sq. and about 6 ft. long, making | Ingots |
| Ingots | Are rolled into | Blooms or Billets |
| Blooms | Are rolled into | Rails |
| Blooms | Are rolled into | Structural Shapes |
| Ingots | Are rolled into | Slabs |
| Slabs | Are rolled into | Plates |
| Ingots | Are rolled into | Sheet Bars |
| Sheet Bars | Are rolled into | Sheets |
| Sheets | Are cold rolled and stamped into | Forms |
| Sheet Bars | Are rolled into | Black Sheets |
| Black Sheets | Cleaned and coated with <i>Spelter</i> (Zinc) make | Galvanized Sheets |
| Black Sheets | Cleaned, cold rolled and coated with <i>Tin</i> make | Tin Plate |
| Black Sheets | Cleaned, cold rolled and coated with <i>Lead</i> and <i>Tin</i> make | Terne Plate |

| | | |
|-------------|--|-----------------------|
| Ingots | Are rolled into | Billets |
| Billets | Are rolled into | Bars and Small Shapes |
| Billets | Are rolled into | Steel Skelp |
| Steel Skelp | Bent into the shape of tubes and welded makes | Steel Pipe |
| Billets | Are pierced, rolled and drawn through dies, making | Seamless Tubes |
| Billets | Are rolled into | Rods |
| Rods | Are drawn through dies into | Wire |
| Wire | Is made into | Nails and Fencing |
| Rods | Are headed into | Rivets and Bolts |
| Rods | Are welded into | Chain |

Typical Analyses and Specifications of the Above

LAKE SUPERIOR IRON ORES (Natural Condition)

| Brand | Loss on Ignition | Moisture | Iron | Sil. | Sul. | Phos. | Manganese |
|--|------------------|----------|-------|-------|-------|-------|-----------|
| American (Marquette)..... | 1.08 | 2.05 | 56.42 | 12.09 | 0.011 | 0.039 | 0.04 |
| Montrose (Gogebic)..... | 2.79 | 10.92 | 54.29 | 5.88 | 0.029 | 0.069 | 0.37 |
| Dover (Mesaba)..... | 4.26 | 13.37 | 51.89 | 5.03 | 0.009 | 0.068 | 0.54 |
| Republic Basic Lump (Used for Open Hearth fix.)..... | None | 0.82 | 65.86 | 2.34 | 0.012 | 0.093 | 0.06 |
| Beaver (Puddling Furnace fix.)..... | 10.71 | 4.12 | 56.27 | 2.69 | 0.028 | 0.072 | 0.38 |

PIG IRON

| | Sil. | Sul. | Phos. | Mang. |
|--|---------------|---------------|---------------|---------------|
| High Phosphorus..... | 1.75 to 2.50 | 0.05 & under | Over 1.00 | 0.35 to 0.70 |
| No. 2 Foundry*..... | 1.75 to 2.25 | 0.05 & under | 0.40 to 0.60 | 0.50 to 0.80 |
| Grey Forge*..... | 0.75 & over | Over 0.05 | 0.40 to 0.60 | 0.50 to 0.80 |
| Strong Foundry and Car Wheel Basic (Chill cast)..... | 0.75 to 1.50 | 0.05 & under | 0.30 & under | ..... |
| Malleable..... | Not over 1.00 | 0.05 & under | ..... | ..... |
| Bessemer..... | As desired | 0.05 & under | 0.20 & under | Not over 0.80 |
| Low Phosphorus..... | 1.00 to 2.00 | 0.05 & under | 0.10 & under | ..... |
| | 1.00 to 2.00 | 0.035 & under | 0.035 & under | ..... |

*Mahoning and Shenango Valley.

IRON CASTINGS

| | Total Car. | Sil. | Sul. | Phos. | Mang. |
|-----------------|------------|------|-------|-------|-------|
| Light..... | 3.40 | 2.75 | 0.075 | 0.75 | 0.40 |
| Medium..... | 3.50 | 1.75 | 0.080 | 0.55 | 0.60 |
| Semi-steel..... | 3.30 | 1.30 | 0.075 | 0.40 | 0.45 |
| Malleable..... | 2.50 | 0.75 | 0.070 | 0.19 | 0.25 |

WROUGHT IRON

| | Total Car. | Sil. | Sul. | Phos. | Mang. |
|---------------|------------|-------|-------|-------|---------------|
| Muck Bar..... | 0.10 | 0.108 | 0.052 | 0.193 | Not over 0.10 |
| Skelp..... | 0.05 | 0.040 | 0.050 | 0.10 | Not over 0.10 |

STEEL BILLETS AND SHEET BARS

| | Car. | Sul. | Phos. | Mang. |
|--------------------------------|--------------|--------------|--------------|--------------|
| Bessemer..... | 0.08 to 0.12 | 0.08 or less | 0.09 to 0.12 | 0.35 to 0.50 |
| Acid O. H. | 0.08 to 0.12 | 0.06 or less | 0.08 or less | 0.35 to 0.50 |
| Basic O. H. (Soft)..... | 0.08 to 0.12 | 0.05 or less | 0.05 or less | 0.30 to 0.45 |
| Basic O. H. (Phos. added)..... | 0.08 to 0.12 | 0.05 or less | 0.08 | 0.40 to 0.50 |
| Am. Ingot Iron | 0.02 | 0.021 | 0.005 | Trace |

RAILS

(Chemical Specification, Asso. of Amn. Steel Manufacturers)

| | Car. | Sil. | Phos. | Mang. |
|------------------|--------------|---------------|---------------|--------------|
| Bessemer..... | 0.35 to 0.55 | Not over 0.20 | Not over 0.10 | 0.70 to 1.14 |
| Open Hearth..... | 0.46 to 0.75 | Not over 0.20 | Not over 0.04 | 0.60 to 0.90 |

STEEL CASTINGS

(Extract from Specifications, Amer. Society for Testing Materials)

| | Minimum Physical Requirements | | | | Maximum | | |
|-----------------------|----------------------------------|-----------------------------|---------------------------|------------------------|---------|-------|-------|
| | Tensile strength lb. per sq. in. | Yield point lb. per sq. in. | Per cent. elong. in 2 in. | Per cent. red. in area | Car. | Sul. | Phos. |
| Ordinary Castgs..... | None | Require d | | | 0.40 | ..... | 0.08 |
| Tested Castgs, Hard | 85,000 | 38,250 | 15 | 20 | ..... | 0.05 | 0.05 |
| Tested Castgs, Medium | 70,000 | 31,500 | 18 | 25 | ..... | 0.05 | 0.05 |
| Tested Castgs, Soft | 60,000 | 27,000 | 22 | 30 | ..... | 0.05 | 0.05 |

BOILER PLATE AND RIVET STEEL

| | Plange Steel | Fire Box Steel | Extra Soft Steel |
|---|---------------------------|---------------------------|---|
| Phos. not to exceed..... | Acid 0.06% Basic 0.04% | Acid 0.04% Basic 0.03% | 0.04% |
| Sul. not to exceed..... | 0.05% | 0.04% | 0.04% |
| Manganese..... | 0.30 to 0.60% | 0.30 to 0.50% | 0.30 to 0.50% |
| Ult. T. S. lb. per sq. in. | 55,000-65,000 | 52,000-62,000 | 45,000-55,000 |
| Yield point, lb. sq. in. not under..... | $\frac{1}{2}$ Ult. T. S. | $\frac{1}{2}$ Ult. T. S. | $\frac{1}{2}$ Ult. T. S. |
| Elong. % in 8 in. not under..... | 1,500,000 | 1,500,000 | 1,500,000 |
| Cold bend..... | Ult. T. S. | Ult. T. S. | Ult. T. S. |
| Quench bend..... | 180° flat | 180° flat | (but need not be over 30%) 180° flat |

STRUCTURAL STEEL FOR BUILDINGS

| | Struc. Steel | Rivet Steel O. H. |
|--|-------------------------------|-------------------------------|
| Phosphorus, maximum, Bessemer | 0.10 per cent. | ..... |
| Phosphorus, maximum, Open Hearth..... | 0.06 per cent. | 0.06 per cent. |
| Ultimate tensile strength, pounds per square inch..... | 55,000-65,000 | 48,000-58,000 |
| Yield point..... | $\frac{1}{2}$ Ult. tens. str. | $\frac{1}{2}$ Ult. tens. str. |
| Elongation, minimum, per cent. in 8 inches..... | 1,400,000 | 1,400,000 |
| Character of fracture..... | Ult. tens. str. Silky | Ult. tens. str. Silky |
| Cold bend without fracture..... | 180° to dia. of 1 thickness | 180° flat |

TOOL STEEL

| | Tungsten | Chromium | Car. | Sul. | Phos. | Sil. | Vanadium |
|-----------------------|----------|----------|------|---------------|-------|-------|----------|
| Carbon Steel..... | ..... | ..... | 1.10 | 0.03 | 0.015 | 0.20 | ..... |
| High Speed Steel..... | 18.00 | 3.50 | 0.55 | 0.012 or less | Trace | Trace | 1.00 |

Pressure on Plate Mill Rolls

A Method for Its Regulation as Practiced in a German Mill

Stahl und Eisen of November 23, 1911, contains an article on the governing of pressure on plate mill rolls, by Dr. J. Puppe, of Breslau. Plate mills are the ones which suffer most from broken rolls, housings, pinions and couplings. This is due to the extremely variable burden put on the mill, which in its turn is due to several causes. Many proposals have been made for governing the pressures on the rolls, whereby unallowed high pressures and demands on the materials can be prevented. Recently a proposal worthy of serious consideration was made by Chief Engineer O. Zeller of Dillingen, which may be briefly described because of the importance of the whole question. In the original paper several of the old proposals are first mentioned in some detail. That of C. Sacks, depending upon hydraulic pressure, is taken up. The German patent on this method is class 49, No. 18451, obtained in 1881. Three proposals of Sacks are carefully described. Next comes a method patented in 1895, class 7, No. 91573, under the title, "Rolling Mill with Hydraulic Placing of the Rolls."

The new method proposed by O. Zeller is shown in Figs. 1, 2 and 3. As is clearly seen in Fig. 1, the pressure is taken up as usual by the screw, the nut for which moves vertically in the head of the housing. This nut opens at the top conically. On it rests a pressure plate, which is completely independent, and after turning 90 deg. can easily be taken away. On the pressure plate rest two levers, fastened with bolts to the housings, the free outer ends resting on the pistons of two pressure cylinders. The ratio of the lever arms is 1 to 3. Because of this and due to the use of two reducing boxes on each housing, each pressure cylinder takes only one-twelfth of the pressure on the rolls. If we take as the highest pressure that is to be expected, 1000 metric tons (2204.6 lb.), then the pressure on each cylinder is 83.3 metric tons. With a piston diameter of about 300 mm. (11.81 in.) this gives about 118 atmospheres in each pressure cylinder, and with good tightening of the pistons and pipe connections it is still possible to operate under such a pressure.

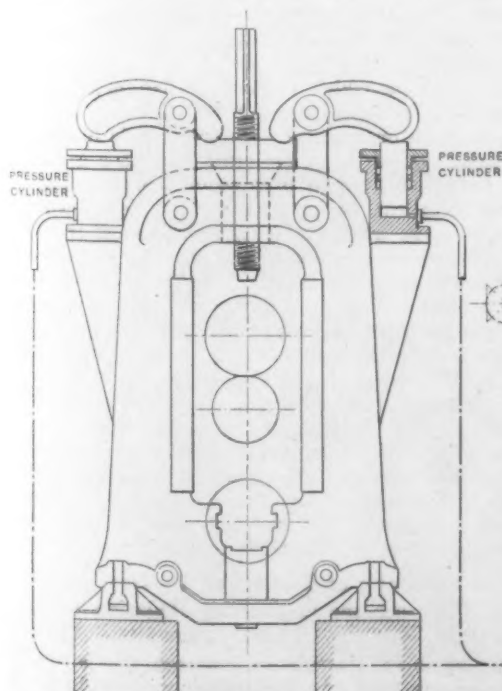


Fig. 1.

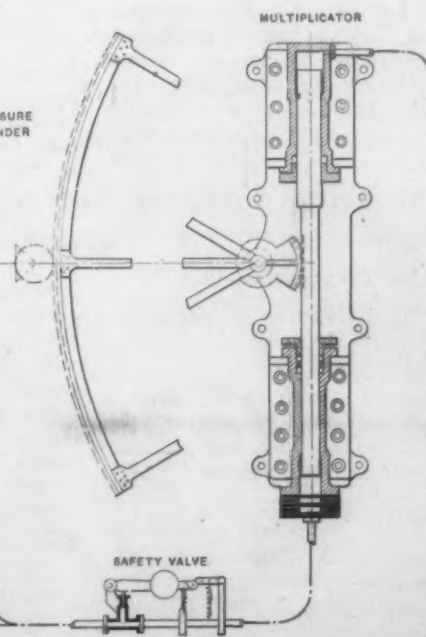


Fig. 2.

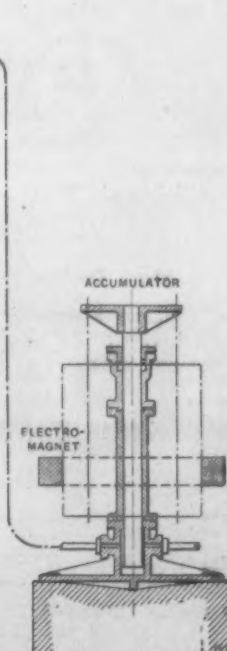


Fig. 3.

The Zeller Method of Regulating Pressure on Plate Mill Rolls

The back pressure is produced in the multiplicator shown in Fig. 2, which is connected to the water pressure pipes. If the pressure on the rolls is greater than the back pressure in the multiplicator, then the piston rod in the latter is pressed upwards, whereby a lowering of the pistons in the pressure cylinders and of the pressure on the rolls is brought about. When the allowed pressure on the rolls is exceeded, the upward movement of the piston of the multiplicator is shown and measured by a hand. For instance, in this special case the distance between the rolls is shown 15 times greater by the multiplicator pointer. This increased value, therefore, can be determined and considered when calculating the size of the next pass. The water which is pressed out of the multiplicator is collected in the accumulator shown in Fig. 3.

In order to prevent too great a play of the accumulator weight with the up and down character of the burden, a kind of safety valve is installed in the connecting pipe between the pressure cylinders and the multiplicator. When a certain pre-determined highest pressure is exceeded the lever of the safety valve is raised. This closes an electric current for the fraction of a second, which operates the electromagnet shown in Fig. 3. This holds the weight fast so long as the circuit is closed, and so prevents an upward rebound of the weight. Probably, however, this will not be necessary in practice.

The great advantage of the Zeller proposal consists in the use of four pressure cylinders for governing the pressures on the rolls, whereby a continuous tight condition of the pistons and connections is favored. A further considerable advantage is that if the pressure plant breaks the cylinders can be removed and replaced with bearings of the proper size, so that no great stoppage in working is caused during the repairing, as is the case with the older proposals. Further, the pressure screw that often becomes fast can easily be removed, together with the nut, from above.

With large plate mills, for which Zeller has designed his new kind of pressure governor, arrangements for preventing ununiform movements of the pistons of the pressure cylinders, due to an uneven burden on the rolls, ought not to be necessary, and in this way the whole arrangement is very much simplified.

If, however, the necessity for equalizing the burden should come up, the two cylinders of each housing could be connected through a common pipe with one multiplying cylinder. These two multiplying cylinders will be solidly connected and will carry over the pressure in common to the cylinder connected with the accumulator. In this way, with an unequal stress, the same amount of liquid will be sucked from the lower burdened pair of cylinders as will be pressed from those more highly burdened.

It should be considered that the cylinders and accessories are calculated to take easily the excess burdens following one-sided entrance of the material to the mill. It should also be remembered that the Zeller arrangement is only proposed for large plate mills and not for small ones where the work has to be finished to very close dimensions. The necessary degree of accuracy for these large mills can be reached, especially if a liquid of greater viscosity than water is chosen.

G. B. W.

The Chicago Pneumatic Tool Company's Report

A Sharp Decline in Net Earnings from 1910

The Chicago Pneumatic Tool Company has issued its annual report for the year ended December 31. The income account compares as follows with 1910:

| | 1911. | 1910. |
|------------------------|-------------|-------------|
| Net earnings | \$772,527 | \$1,054,809 |
| Charges | 165,000 | 166,733 |
| Balance | \$607,527 | 888,076 |
| Dividends | 257,951 | 257,951 |
| Balance | \$349,576 | \$630,125 |
| Depreciation, etc..... | 194,787 | 193,149 |
| Surplus | \$154,789 | \$436,975 |
| Previous surplus | 1,509,149 | 1,072,174 |
| Total surplus | \$1,663,938 | \$1,509,149 |

The general balance sheet as of December 31 compares as follows:

| Assets. | | 1911. | 1910. |
|--------------------------------------|--|--------------|--------------|
| Real estate, plant, etc..... | | \$6,978,288 | \$6,922,185 |
| Stock other companies | | 1,121,669 | 1,121,669 |
| Accounts and bills receivable..... | | 1,143,210 | 1,116,892 |
| Inventory | | 1,405,138 | 1,109,835 |
| Cash | | 92,285 | 241,966 |
| Treasury stock | | 37,000 | 37,000 |
| Sinking fund | | 682,906 | 600,787 |
| Treasury bonds | | 200,000 | 200,000 |
| Total | | \$11,660,598 | \$11,350,336 |
| Liabilities. | | 1911. | 1910. |
| Capital stock | | \$6,485,800 | \$6,485,800 |
| First mortgage 5% | | 2,500,000 | 2,500,000 |
| Interest and dividends payable | | 122,212 | 122,388 |
| Accounts payable | | 196,740 | 119,716 |
| Reserved for taxes, etc..... | | 9,001 | 12,495 |
| Sinking fund | | 682,906 | 600,000 |
| Surplus | | 1,663,937 | 1,509,149 |
| Total | | \$11,660,598 | \$11,350,336 |

From President W. O. Duntley's accompanying remarks the following extracts are taken:

The net earnings are considerably below those for the year 1910, the most prosperous in the history of the company, mainly due to the fact that business conditions generally were most unfavorable, and the market for the products of the company was unusually restricted. Particularly noticeable was the falling off in the sales of spare parts. The sales of new tools, however, almost equaled those of 1910, chiefly attributable to the fact that the company secured about 4000 new customers in 1911. The total net earnings of the company for the 10 years in which it has been in business amount to \$4,254,500. It will, therefore, be seen that the net earnings for 1911 are close to the average and are normal.

Early last year the business of the Rockford railroad section and inspection gasoline motor cars, which had previously been successfully exploited, was purchased outright, and is being handled profitably in connection with the company's railroad department selling organization. The light motor truck for commercial use (the Little Giant commercial automobile), referred to in the annual report for 1910, has been practically developed. It is now enjoying a very good reputation as being one of the best of its class in the market. It is expected that the earnings from this branch of the business will be very remunerative.

At the present time all the plants are being operated to their capacity. The foreign subsidiary companies are expanding their business steadily and their earnings have been materially increased over former years.

New Publications.

Hand-Forging and Wrought-Iron Ornamental Work.

By Thos. F. Googerty, instructor of forge work, Stout Institute Summer School of Forging. Cloth; 208 pages, 12mo. Published by the *Popular Mechanics' Book Department*, 318 West Washington street, Chicago. Price \$1, postpaid.

In a volume which the author designed to satisfy a demand for an inexpensive text-book on the subject of hand-wrought ornamental ironwork, timely because of the increasing popularity of art craft in iron, a great deal of information is given of ornamental hand forging, including an excellent presentation of the fundamental principles of forge work. Instructors in manual training, students, professional workers and the general public interested in the processes will be enlightened and entertained by the book. While the author declares it was not his intention to treat of design, that being a field of itself, enough is told to show how this phase of the handicraft should be approached. Interior ironwork is largely dealt with. The book is written in clear terms and with explanations that easily carry the apprentice or layman through the intricacies of the subject as a practical working handbook should. The work of the smith, always interesting, has not lost anything by the author's treatment. Almost every page has an illustration of tools, methods or specimen forgings, there being 122 in all.

Twelve Principles of Efficiency. By Harrington Emerson. Publisher, the Engineering Magazine, 140-142 Nassau street, New York. Cloth; pages, 424. Price, \$2.

The name of Harrington Emerson stands out prominently among men who have distinguished themselves in endeavoring to secure better results from those who are

engaged in productive work. Mr. Emerson has written much on this subject and he has also done much in putting his ideas in practical effect in workshops. He has in his various writings laid down 12 principles for the attainment of efficiency. In this particular volume he takes up these principles and discusses their application. They are as follows: 1. Ideals. 2. Common Sense and Judgment. 3. Competent Counsel. 4. Discipline. 5. The Fair Deal. 6. Reliable, Immediate and Accurate Records. 7. Planning and Dispatching. 8. Standards and Schedules. 9. Standardized Conditions. 10. Standardized Operations. 11. Written Standard Practice Instructions. 12. Efficiency Reward. Each of these is treated in a chapter. Two chapters are added to show how the principles are applied as a means of diagnosis of industrial conditions and correction of existing inefficiencies, as follows: Efficiency Principles Applied to Measurement and Cure of Wastes. Executive Control of Line and Staff. The book commends itself to all who are interested in the great question of endeavoring to develop the highest efficiency of the establishment under their charge.

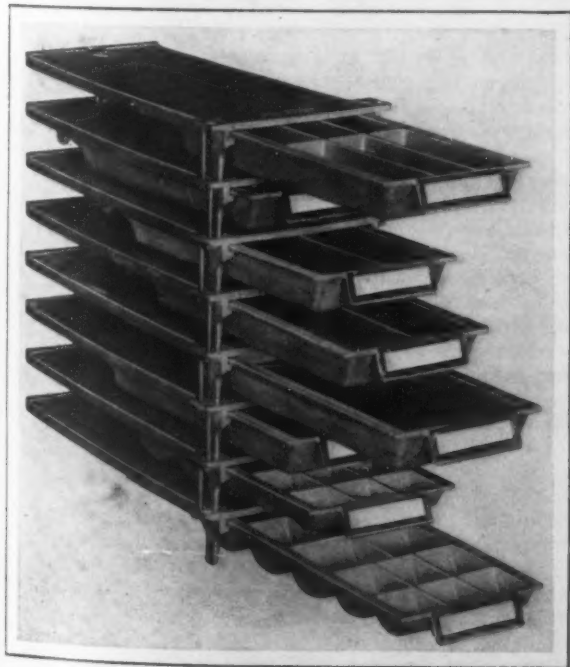
Efficiency as a Basis for Operation and Wages. By Harrington Emerson. Publisher, the Engineering Magazine, 140-142 Nasau street, New York. Cloth; pages, 254. Price, \$2.

This is the third edition of Mr. Emerson's great work, and has been revised and enlarged. No better testimonial could be given to the favor with which this has been received than the fact that the demand is sufficient to call for another edition. It shows that the desire for information how to improve works management is widespread and that a multitude of men are availing themselves of the literature on the subject.

Stock and Tool Unit

As a substitute for the ordinary bench drawer or wooden cabinet in the machine shop, stock room, carpenter shop and pattern shop, F. O. Weydell, 224 South Jefferson street, Chicago, Ill., is manufacturing a cast-iron tool and stock unit in various forms. These trays are made in different styles and sizes and are adapted to taps, drills, chisels and other tools, and their use is said to make it possible to avoid the confusion and disorder into which the small tools of a shop are sometimes thrown. It is possible to hang the cast-iron trays under the bench like a drawer or may be arranged in stacks, as shown in the accompanying engraving.

A unit consists of one rack and one tray, the latter sliding in grooved runways on each side of the rack. The con-

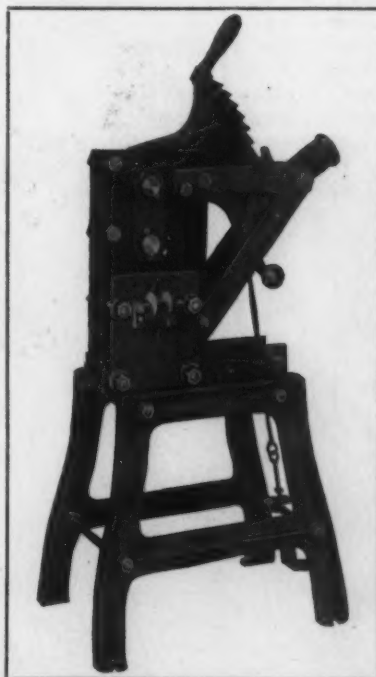


A Unit Forming a Portion of the Stock and Tool Rack, Made by F. O. Weydell, Chicago, Ill.

struction is such as to allow an easy and free opening and closing of the tray, a stop having been provided to prevent the tray from being entirely withdrawn from the rack by accident. The rack sections are designed to fit into each other and permit the stacks to be built up continuously. Both the rack and the tray are made of cast iron and are finished in black japan. In addition to the tray for small tools, a special style is made which can be used for filing of pattern letters.

Reinforcing Bar Cutter

One of the tools recently developed and added to its line by the Buffalo Forge Company, Buffalo, N. Y., is a machine for cutting the reinforcing bars employed in concrete construction work.



A New Type of Cutter for Concrete Reinforcing Bars Built by the Buffalo Forge Company, Buffalo, N. Y.

The capacity of the new cutter, here illustrated, is square, twisted bars having a cross sectional area of 1 sq. in. and round reinforcing material up to a maximum diameter of 1 1/2 in. One of the special features of the machine is its portability. The weight is only 300 lb., and for that reason it is possible to use it on a scaffold and move it from place to place easily.

Two steel plates are employed for the frame, and the cutting tools are located in two openings therein. A ratchet operates the knife plunger, and when the cut has been completed depressing the treadle returns the knives to the highest point of their stroke automatically. The automatic return of the knives causes ratchet segment to drop, and the machine is then ready for the next cutting operation. To prevent the cut portions of the bar from binding against the knives a stripper is located at the front of the machine.

As will be noticed from the engraving, there are two openings in the frame. The upper one of these is intended for large bars, while the smaller sizes are taken care of by the lower opening. When the cutter is operating on bars measuring less than 1/2 in., a third pair of knives is provided, and these can be changed easily without employing a wrench or any other tools. The roller at the front of the machine is designed to be used with long bars and is intended to prevent stock of this character from sliding over the cutting edges of the knives and dulling them when the bars are being fed into the cutter.

Eminent architects will design the buildings that will grace the site of the Panama-Pacific International Exposition, which is to be held in San Francisco, in 1915. McKim, Mead & White, Henry Bacon and Thomas Hastings, of New York, and L. C. Mullgerdt and George W. Kelham, of San Francisco, will assist the members of the Architectural Commission, consisting of Willis Polk, William A. Faville and Clarence R. Ward, in planning the exposition.

The George Nash Company, 646 Washington Boulevard, Chicago, importer of high grade steel, has greatly increased its stocks at New York and Chicago. A 72-page catalogue describing the company's line and giving an itemized stock list also devotes considerable space to hints to practical users of tool steels, with other interesting information.

Mechanical Electro-Galvanizing*

The Cold Process of Coating Metal with Zinc and the Different Commercial Machines for the Purpose Explained at Length

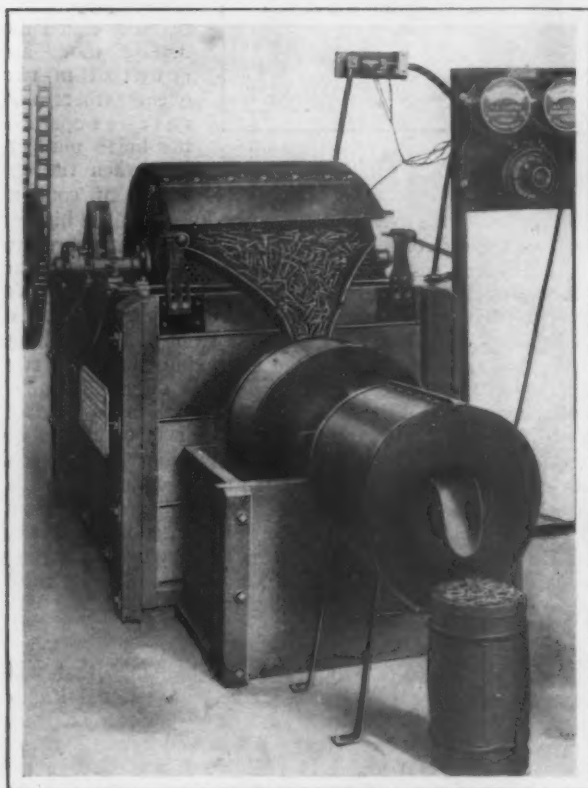
The coating of iron or steel by dipping into a bath of molten zinc is far from being a satisfactory process of galvanizing. Such articles as fine tools, springs, screws, wire gauze and similar things cannot be given a coating of zinc by the hot process. It is limited to a small class of articles the usefulness of which would not be destroyed or at least affected to a certain extent by the heat necessary to melt the zinc, or by the uneven coating of the metal.

Neither is it a reliable protection from rust or oxidation. The coating is of a porous and granular nature, and instead of acting as a preventive of rust, it really helps the corrosion to become more rapid through the electrochemical action which is caused by the moisture of the atmosphere and the chemicals used. The use of ammonium chloride and the chloride of zinc is unavoidable, and the combined salts cause the coating to corrode, in case of mechanical injury, from the inside to the outside, notwithstanding the thickness of the coating given. All threaded material has to be recut, the zinc removed and practically left without any coating; if the material has to be stamped or bent the

Louis Potthoff, president of the U. S. Electro-Galvanizing Company, for developing the process in this country. Within the past five years increased attention has been given to cold zinking or electrolytic galvanizing. More particularly is this so in Germany, Italy, England, Austria



Tank for Continuous Galvanizing of Bars and Tubes, 6 to 30 ft. Long and as Large as 3 in. in Diameter



Patent Automatic Self-Emptying Galvanizing and Plating Barrel, Provided with Automatic Washing, Draining and Drying Apparatus

zinc coat will peel or crack, threads on pipes are cut after they have been galvanized and the bare iron on the threads is exposed, having no protection whatever.

Researches Here and Abroad

The development and perfecting of the cold electro-galvanizing process has been gradual. Much credit is due

*From an illustrated address presented by a representative of the U. S. Electro-Galvanizing Company, Brooklyn, before the National Electro-Platers' Association, New York, February 10.

and Hungary. In the last named country the researches of Czermay have attracted considerable interest. In government yards various shipbuilding establishments, tube and wire works the results obtained have been so economical and gratifying to the users that hot galvanizing has been suspended.

The results that have been accomplished by Czermay on the theory of neutral baths have been amply confirmed by the splendid work accomplished by Prof. C. F. Burgess of our own country. They demonstrate that on the one hand electrolytic zinking resists atmospheric and other corroding influences much better than hot galvanizing, while on the other hand the cold process dispenses with the employment of the dross and skinning man and the man who is needed to keep the pots hot all the 24 hours of the day, and further avoids the inevitable loss of pots and metal.

Electro-galvanized material, having the same thickness of coat as hot galvanized material, has stood the time test very satisfactorily, as proved by experiments and practical tests. Anold Philip, in treating upon this phase of electro-galvanizing, writes: "Apparently with zinc coating obtained by the old-fashioned hot galvanizing method the amount of zinc required to protect an iron surface so that it will withstand one minute immersion in the saturated copper sulphate solution of 15 deg. C. is about 0.248 oz. avoirdupois per square foot, but owing (especially in the case of wire) to the irregularity of the thickness of the zinc coating, the amount may become as great as 0.4 oz. per square foot, while in the case of electro-deposited zinc as little as 0.166 oz. per square foot of surface will afford the same protective effect. The reason of this difference is possibly due to the fact that greater purity of the coating zinc, where electro-deposited, renders local action, and hence corrosion, smaller than in the case with less pure zinc employed in the hot galvanizing method."

Tests of Adhesion of Zinc Coating

The thickness of the coating of zinc by the cold method can, as stated, be regulated according to the requirements and depends upon the length of time the material is allowed to remain in the bath. The coating, furthermore, does not effect the strength, temper or nature of the material galvanized. It is well known that in electro-plating the success of the operation depends on the adherence of the deposit. Prof. Chas. F. Burgess found that the adherence of the coating deposited from a zinc sulphate solution was 482 lb. per square inch, while that of the coating of hot galvanized plates bought in the local

market was 280 lb. The adherence was determined by soldering to the zinc surface, with low melting solder, a copper plug half an inch in diameter. By noting on a spring balance the pull necessary to separate this plug from the iron a measurement of the adherence of the zinc to the iron is made.

The class of work which can be galvanized by the cold method is unlimited, nothing is too small or too delicate, nothing is too large. Fine parts of delicate machinery to large steel girders can be given a uniform coating of pure zinc which will resist corrosion.

Mechanical devices for electroplating purposes are fast coming into use. The most important, probably, is the plating and galvanizing barrel. When developing this barrel we were successful in getting away from the disagreeable necessity of having to remove the barrel from the tank to empty or refill it. With the mechanical plating barrel here illustrated the work is shoveled into the barrel, and when it is finished it is all dry in kegs ready for shipment, without handling the work, with no heavy lifting, etc. The bearings, shafting, gears, etc., are completely out of the solution, insuring a steady operation without any unnecessary loss of power.

The Automatic Electroplating Barrel

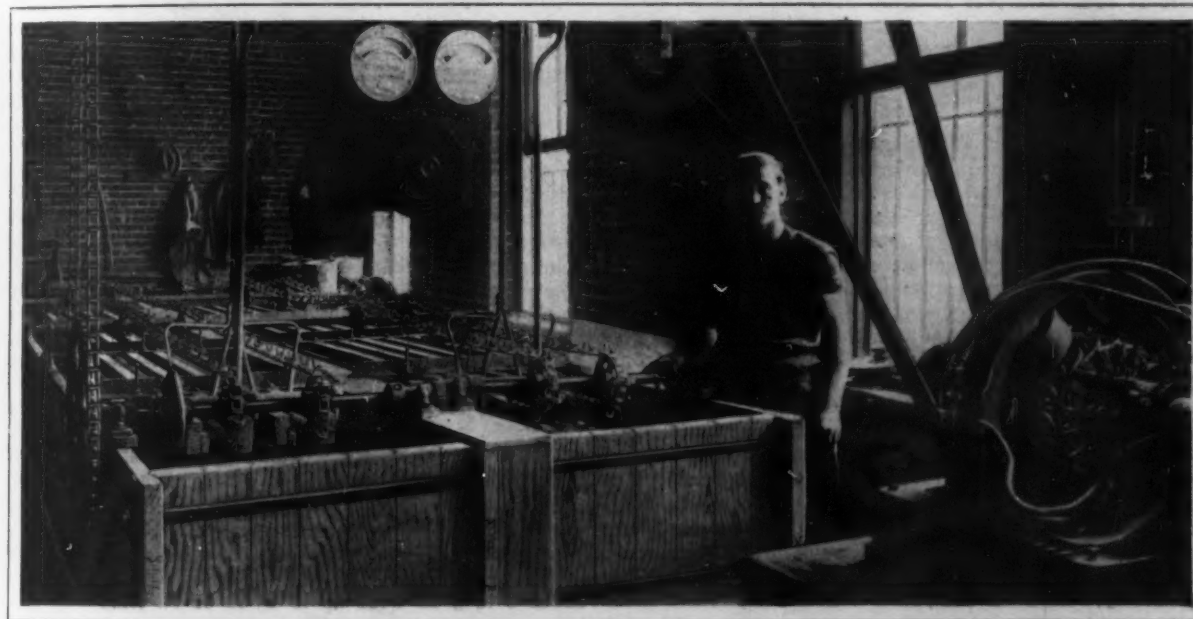
The barrel itself is unique in that it rotates in two directions—in the plating and in the self-emptying direction.

another lot of work is being plated or galvanized in the plating barrel.

This electro-plating device thus provides three different operations: plating, rinsing and drying. These barrels are manufactured in three different sizes—one, 25 in. long and 24 in. in diameter, used mostly for nickel, brass or copper plating; another, 36 in. long and 40 in. in diameter, and the third, 50 in. long and 40 in. in diameter. The latter sizes are mostly used for electro-galvanizing and handling at a time from 150 to 300 lb., according to size and kind of material. They are used also for nickel, brass and copper plating for light bulky material so as to be able to get sufficient output.

The Bar Iron and Tube Tank

The bar iron and tube tank, also shown, is also complete in itself, the work going in at one side to be plated and coming out at the other side ready for shipment. It has one added feature, and that is that the operation is continuous. In plating rods or pipes a 30 min. run is quite sufficient for a good protective coating. The tank of the size shown in the illustration accommodates 30 rods at a time, and 31 minutes after the first rod has been put into the solution, one is completed every minute. In an ordinary work day 500 pipes or rods, ranging from 6 ft. to 30 ft. long and from 1/16 to 3 in. in diameter, can be plated or galvanized.



Patent Automatic Galvanizing Plant Installed for Continuous Galvanizing Small and Medium Size Articles; Capacity, 10,000 to 100,000 Pieces Per Day

When the barrel is running in the plating direction the work comes in contact with patent cathode rods which are protected so that they are only slightly electro-plated, and yet give a perfect contact. They are easily removed and the general practice is to remove them once a month and clean off the deposited metal.

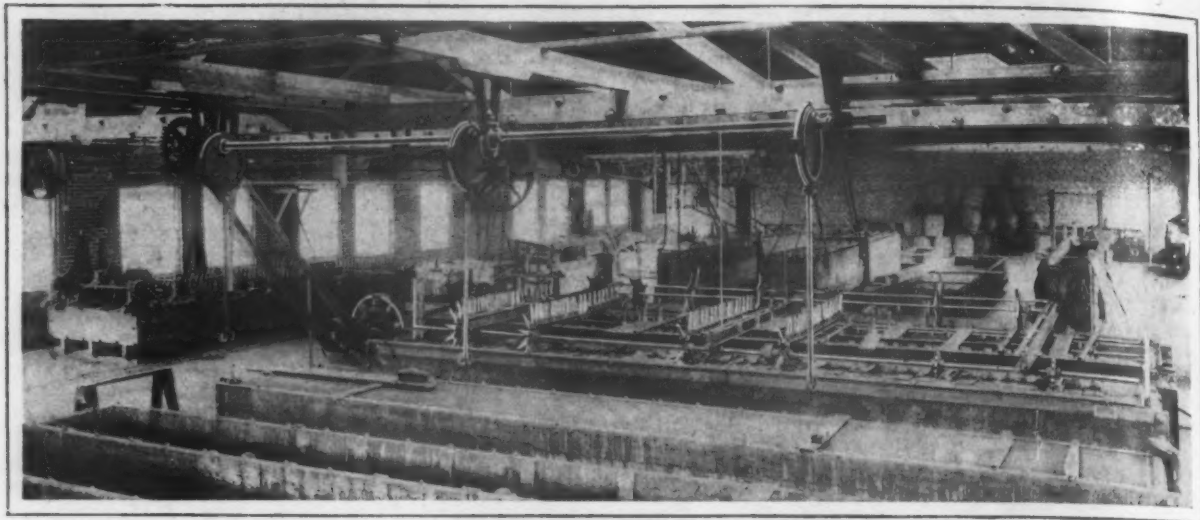
When a sufficient coating of metal is produced a lever is shifted, and the barrel rotates in the opposite direction. When it reaches a certain point an attachment, which controls the door of the barrel, is put into action, and the work is automatically ejected into a washing drum which carries the work to the rinsing tank. With two or three revolutions the barrel is completely emptied and is ready for another load. This emptying door works entirely automatically, and there is no screwing or unscrewing of bolts or lag screws.

In the rinsing tank is fresh clean running water supplied at will. The work being thoroughly rinsed is then delivered, not all at once, but in small lots, to the dryer. A novel feature of this running tank is that, through the use of a special contrivance it reverses its motion when the plating barrel is being emptied and while in this motion does not discharge any of its contents into the dryer until the plating barrel is again run in the plating direction. This gives the advantage of having two operations, going on at one time, each independent of the other, that is, while the rinsing and drying of one batch is going on

The special feature of this tank, aside from the patented mechanical devices which keep the work in motion, is the arrangement of the cathode rods. These are placed under the solution and at an angle with the tank. This not only insures perfect connection, but every second the point of contact is being changed, so that during the entire operation the cathode rod never touches the same place twice. This eliminates all wire marks, or those of supporting hooks or racks. No wetting of the hands or removing the work to shift the wire is required.

The automatic patented conveyor which propels the rods across the tank can be seen in the illustration. The long fingers are made of special wood treated to preserve them. On the side that touches the rod pieces of insulation are inserted so that the wood itself never comes in contact with the work. The fingers slowly propel the work through the solution, keeping the rods or pipes traveling toward the finishing side, at whatever rate of speed the operator desires, the speed regulating the thickness of the coating. They also keep the rods rolling so that the coating of metal is absolutely uniform.

By putting into operation a patented contrivance the anodes of the tanks can be put out of commission and in their place special anodes which plate the inside of the pipes or conduits are connected up. By this arrangement the inside only of the pipes or conduits can be plated, if so required; it is certainly to be understood that the outside



Jobbing Electro-Galvanizing Plant of the Kansas City Galvanizing & Mfg. Company

can be coated also, as well as inside and outside, in one operation. They are handled otherwise exactly the same as rods with just as much ease.

A rinsing and drying apparatus is also connected with this tank, which works automatically, delivering the work ready for shipment.

Other Mechanical Electro-galvanizing Outfits

Ordinary still tanks can be used for electro-galvanizing, but for small work we have devised and patented another labor-saving apparatus, as shown. A peculiarly constructed chain running by a special arrangement is operated on top of the tank. To this chain can be attached work too large for a plating barrel, or too delicate to stand the rumbling, or that would otherwise be hung upon hooks or racks.

The work is hung in at one end of the tank, travels through it and is taken out at the other end finished; from 10,000 to 100,000 pieces can be plated by this device per day. Larger single pieces are hung on hooks, and smaller pieces on racks. Each link of the conveyor chain is provided with a U-shaped hook having extensions on both sides for taking up the current, after the material to be plated or galvanized is placed on hooks or racks, one hook or rack is hung on the chain traveling slowly to the other end of tank. As soon as it is far enough advanced another hook or rack is placed in the tank until the tanks is filled up entirely, then about every half minute one piece or filled

rack is finished and taken out by a boy and replaced by a boy on the starting end.

The output is dependent on the length of the tank, and each tank can be provided with 1 to 4 conveyors. It can also be arranged that the material pass, before reaching the plating or galvanizing tank, through a potash and rinsing tank. The speed is regulated according to the needs of the work, so that a piece of work starting in at one end may be taken out in 15, 20 or 30 minutes, plated according to requirements.

It is well known that work which is kept in motion can be electro-plated with a higher voltage without any danger of burning, and therefore does not have to remain in the solution so long to receive the required deposit. This device keeps the work constantly in motion. Then again work that is kept in motion will not allow the collecting of hydrogen bubbles upon its surface, and consequently no pitting of the work results. Pitting of work is unknown in this tank.

One of the illustrations shows the plant installed for the Babcock & Wilcox Company, at the recommendation of the Government, for galvanizing plates and angles for boiler casings, the Government stating that they preferred the electro-galvanizing for the reason that after galvanizing all faults in the plates will show up, as by the electrolytic process the galvanizing follows the surface and does not cover up faults. This plant has galvanized heavy plates about 8 to 9 ft. wide up to 15 to 18 ft. long.



Electro-Galvanizing Plant for Galvanizing Heavy Boiler Plates and Angles for Government Work, Installed for the Babcock & Wilcox Company, Bayonne, N. J.

Senate Finance Committee Tariff Hearings

Manufacturers Protest Against Certain Reductions in the Underwood Metal Schedule Bill—Testimony of Charles M. Schwab

The position of the majority of the Senate Finance Committee on tariff legislation is indicated by a statement by Senator Penrose, the chairman, that he and his colleagues had resolved to take no action on any schedule that had not first been examined and passed upon by the Tariff Board. It is further stated, however, that all who desire to appear before the committee in connection with the Underwood metal schedule which passed the House January 29 will have an opportunity. The expectation is that the hearings, which began last week, will require two or three weeks.

A Saw Manufacturer's Protest

Henry C. Atkins, president of E. C. Atkins & Co., saw manufacturers, Indianapolis, Ind., testified at the hearing on Wednesday, February 7, pointing out that the present duty on saws, reduced to ad valorem rates, are between 20 and 25 per cent. The proposed rates would reduce this to about 12 per cent. Under such an arrangement, the witness said, his company would lose about \$120,000 per year. Mr. Atkins said that according to his information there are about 85 saw establishments in the country with a total capitalization of about \$11,000,000, employing over 5000 wage earners. In his own establishment he meets with competition from Sweden in crosscut saws and a little in band saws. From England the competition is in circular saws, and from Germany the competition is in band saws and the cheaper handle saws. The witness said that a friend had collected some data on the foreign wage scale, and reading from his notes he said that a German laborer is paid about seven cents per hour, whereas in the United States similar laborers get about forty cents per hour. There is very little importation of saws now, he admitted, and on the other hand exports are light.

In 1909 Mr. Atkins said his firm established a branch factory in Canada in order to supply the trade there, which is growing rapidly, especially among the lumber people. While the cost of manufacture in Canada and in the United States is about the same, a saving is made because he does not have to pay the 30 per cent. duty on goods imported from the United States. Furthermore, his plant is nearer the market. Had he not established this plant in Canada he could not compete with the saws imported there from England. If the tariff protection is cut down as proposed in the House bill his profits, he said, would be wiped out and they would have to try to make a saving in the marketing and production of the goods. Senator Simmons suggested that a reduction in the duty on the raw material would reduce by that amount the need of protection on the finished product. The witness said this might be so, but that the raw material is but 28 per cent. of the cost of manufacture. Labor alone is more than 28 per cent. and the cost of that is regulated by the unions and he cannot hope for a reduction in it.

Free Wire Products and Dutiable Raw Material

J. E. Frederick, of Kokomo, Ind., representing the Kokomo Steel & Wire Company, said that his company manufactures wire nails, barbed wire and wire fence, and for this purpose had to buy its steel in the market. He said that the proposed bill placed a tariff of 10 per cent. on ingots, billet, etc., whereas the wire fence is placed on the free list. He contended that this was unjust, and added that he would not object to having his products placed on the free list if Congress will place his raw materials on the free list also. However, he thought it the wisest policy, even with free raw materials, that the duty should be made in proportion to the labor expended in making it into the finished product. Mr. Frederick said that he exports a negligible quantity because his plant is not situated to do an export business. At the present time he is running his plant full time, but for two years previous he has been running but 75 per cent. of capacity. He explained that he is now running overtime because this is the busy season of the year, when merchants are beginning to stock up for the

spring and summer season. After this live season is over he might have to go back to running only 75 per cent. His labor cost, he said, was about 35 or 40 per cent. of the cost of manufacture. He was led to state that he based his selling price upon the prices quoted by the large manufacturers. While the price is based upon the law of supply and demand, some one has to measure that law, and in this instance it is measured by the "big fellows."

Mr. Frederick told of importing 5000 tons of billets at one time, paying all charges and getting them at \$29 per ton, when the price for billets at Pittsburgh was \$32. Asked if at that time the United States Steel Corporation was making \$10 a ton on steel billets, he replied, "Certainly; because a few years before steel billets were sold at \$14 a ton."

Charles M. Schwab Against Lower Duties

At the hearing of Thursday, February 8, President Schwab, of the Bethlehem Steel Company, appeared in opposition to the Underwood bill. He told of the building up of the new Bethlehem plant and of the vast amounts expended in construction there. He took up labor conditions and protested against the unfairness of the Government report on labor at South Bethlehem.

"The report is based on the investigation of only 9,184 men," said Mr. Schwab. "The investigators evidently overlooked the fact that we employ in our works at Bethlehem from 13,000 to 15,000. The report declares that we work men 12 hours a day for seven days and pay an average wage of 13½ cents an hour. It says nothing of the large number of apprentices we employ. We have tried to change our system of employment, but at my plant the men voted unanimously for the long hours. We pay by the hour and the men would rather work longer and make more money." Mr. Schwab denied that the lowest wages in the industry were paid at his plant. He said that the average wages of the men employed was \$780 a year.

Questions by Senators brought from Mr. Schwab the statement that pig iron would cost one-half more for labor if present day rates were maintained and the 12-hour day were changed to an 8-hour day. Senator Simmons expressed the opinion that men should not work on Sunday, to which Mr. Schwab assented. He said that experiments were being tried in the reduction of Sunday labor, and expressed interest in them.

Mr. Schwab pointed out that Germany is a serious competitor of America in the steel industry. He said that it costs from \$22 to \$23 to make a ton of steel rails in this country, whereas they can be made in Germany for from \$18 to \$19 a ton.

"I stand by my statement that I made to the Ways and Means Committee," said Mr. Schwab. "I then gave the cost per ton at \$22 to \$23. As to Germany, I can only estimate. I know that pig iron sells in Germany for \$8.50 to \$9 a ton, and I know that it costs \$10 a ton to turn pig iron into rails." He added that pig iron could be made in China for \$7.50 per ton, and that he was importing iron from there for his San Francisco works.

"I am most emphatically opposed to any reduction in the tariff," declared Mr. Schwab. "If this bill becomes a law I shall sell out my stock in the Bethlehem works and retire from business. I want it to be understood that my interest in making the Bethlehem works the largest and best in the country is not necessary to me from a financial viewpoint. I do not desire to get richer. I have no heirs to leave my money to, and my greatest pleasure, and just now my only pleasure in life, is to build a big business in Pennsylvania. But with this bill a law I shall drop it all and take no further interest in the steel business."

The witness said that his capitalization amounted to \$55,000,000 and that his annual output was about \$35,000,000. In the last seven years he said no dividends had been taken out of the business, and all the profits had been put into betterment. "The steel industry has not given an adequate return on the capital invested in the last few years. It is

my opinion that no independent steel company is making money at the prices of to-day. In years of prosperity we make good money. But in years of depression we lose, so that averaging in the good and the bad years we make a reasonable profit. But you put the tariff down and we will not have these years of prosperity."

Mr. Schwab, being asked as to Mr. Carnegie's opinion that there is no longer need of a tariff on steel, said: "I must refuse to discuss any statement from a man so dear to me as Mr. Carnegie is. Mr. Carnegie has been a father and more to me, and I do not care to discuss his views."

"In the development period from 1880 until recent years we needed protection," said Mr. Schwab, in reply to further questions. "As far as the development of the industry is concerned, we do not need it to-day. But I do say that we need it to protect us in the East from the importations from Germany and the cheap labor abroad. On many occasions I have said that, with equal conditions, steel could be made as cheaply in the United States as in any other country," added Mr. Schwab. "This has been construed into a statement that steel is made as cheaply here as elsewhere. That I have not said, and I do not say. With the same conditions, especially with labor as cheap, we ask no protection, but the labor account weighs heavily against us. Only 100 miles from New York, it costs as much to put our steel there as it does to bring it from Holland. I consider the present tariff rates necessary to the prosperity of the steel business."

Mr. Schwab predicted that United States rails not only would be driven out of the foreign market if the proposed reductions were put into effect, but that foreign manufacturers would be selling rails in this country within a year.

Spencer Miller, of Lidgerwood Mfg. Company

Spencer Miller, representing the Lidgerwood Mfg. Company, New York, appeared before the committee Thursday, February 8, and made substantially the following statement:

There are three points in reference to the bill that I would like to call attention to. The first is the definition of a machine tool. It has been brought to my attention within the last 24 hours that by a recent decision any tool that does work, whether it is a metal-cutting tool or a dirt-cutting tool, is a machine tool. If an excavator is a machine tool, it would be very serious to bring in that sort of machinery from abroad free. I have no further facts; I only ask the committee to consider that phase of the question. In other words, what is a machine tool?"

The Chairman: Have you a copy of that decision?

Mr. Miller: I have not, unfortunately.

The Chairman: Can you get a copy and furnish it to the committee?

Mr. Miller: I will seek it out and be very happy to file it. The next point will be found on page 91, where you provide 15 per cent. on steam engines. Now, what is a steam engine? A hoisting engine and a ship's winch are practically two steam engines, with a gear and a drum. The question is, Are steam winches to come into this country as steam engines? Are hoisting engines and winches to come into this country at 15 per cent? Because three-fourths of a hoisting engine is a steam engine? It seems that there should be some definition there. I presume, however, it is the intent that hoisting engines and the ship winches should come in under machinery on page 94. Here the duty has been, under the Dingley and the Payne tariffs, practically 45 per cent. for a long period of years. The conditions of business, therefore, have been produced by a long continuation of one tariff. It is proposed now to reduce this to 25 per cent. Note the result. There were \$6,792,000 of imports last year of foreign machinery. It is estimated that this will be increased to \$10,500,000. That will mean that the imports will be increased \$3,700,000, 75 per cent. of which is labor; and, therefore, the American laborer loses out on that transaction, \$2,700,000. Furthermore, the Government, according to the estimate, gets less duty, so the Government losses \$186,000. In other words, the Government loses and the American laborer loses, and if the fundamental principle of a tariff is the protection and prosperity of the American laborer, why certainly this provision is inconsistent. Furthermore, if in 1905 practically \$3,000,000 of machinery were imported, \$8,000,000 in 1910, and \$6,000,000 in 1911, and it is proposed that \$10,000,000 worth shall be imported, it will not be imported by American workmen but imported by capitalists. Therefore the provision of this paragraph of the bill is for the benefit of the capitalist absolutely, at the expense of the laboring man. Potatoes are consumed, of course, by the laboring man; but machinery is not purchased by laboring men;

machinery is purchased purely and simply by capitalists.

I have visited German works and English works. Our company has works in Scotland. If it will be of advantage to this committee I shall be very happy indeed to prepare and file the wage scale in our works in Scotland and our own works in Brooklyn.

The Chairman: The committee would be very glad if you would furnish it with your statement, which will be printed as a part of your remarks.

Mr. Miller: I also know that the price of ship winches in England is less than half what it is here. And I want to add that I think we make a great mistake when we underestimate the efficiency of foreign workmen. In our own shops we recognize foreign workmen as efficient and we hire them.

A Protest from Pacific Coast Rolling Mills

The condition of the independent manufacturers of bar steel and iron on the Pacific Coast was described to the committee by William Piggott, of the Pacific Coast Steel Company, of Seattle, which operates a rolling mill in Seattle and one in San Francisco. "We have competition enough with Germany and Belgium as it is," said Mr. Piggott, "but if the duty on bar iron is lowered to the point set by the Underwood bill we will have to get out of the business. In fact, I do not know of a stockholder in a rolling mill on the Pacific Coast who has drawn a dividend." He said that if the duty were reduced the market on the Pacific Coast would be absolutely thrown over to Germany and England. He added that under the proposed duty it would cost \$5 a ton more to ship bar steel from Pittsburgh than it would from Germany to the Pacific Coast.

Pen Manufacturers Heard

A. C. Wood, Camden, N. J., appeared before the committee on Friday, February 9. He said that the present law imposes a duty of from 12 to 15 cents per gross on pens, whereas the House bill proposes to reduce this to an ad valorem duty of 25 per cent. He said that the cost of manufacturing pens is 66 per cent. labor in his plant, and that our manufacturers will be at a serious disadvantage if they are compelled to compete actively with European labor. The reduction in steel duties would in no way equalize the reduction in finished products. The claims of the steel pen industry were also presented by Frank W. Lilley, of the Eagle Pencil Company, and George E. Bartoll, of the Huff Pen Company, Camden, N. J.

Colorado Rod Mill Makes a Record

We have received from F. E. Parks, assistant manager Minnequa Works, of the Colorado Fuel & Iron Company, Pueblo, Colo., a report of the work of the No. 1 rod mill February 5. On that date this mill, which is a Garrett mill, turned out the company's record product for 12 hours. As far as known, no other rod mill has ever equaled the output here noted. The figures are as follows:

Billets charged, 4-in. soft steel Bessemer, 764,305 lb.; production, No. 5 rods, 707,876 lb., or 316 gross tons.

The scrap produced was 10,570 lb. The loss of time in changing passes was 10 minutes.

The Brier Hill Steel Company, Youngstown, Ohio, which is a merger of the Empire Iron & Steel Company and the Thomas Steel Company, of Niles, Ohio, together with the Brier Hill Iron & Coal Company, and the Youngstown Steel Company, of Youngstown, Ohio, announces that its New York offices will be at 345 Fifth avenue. W. C. Dickey, who for several years has been associated with the Empire Iron & Steel Company at the same address, will be in charge of this branch.

The Cleveland Twist Drill Company on March 1 will move its New York store from its present quarters, at 63 Reade street, to 30 Reade street. Its business requirements have outgrown the building, where the company has been located for some time. In its new quarters there will be double the amount of space, permitting orders to be handled more expeditiously.

The International Harvester Company of Chicago has started an investigation to determine the extent to which tuberculosis exists among its employees. It is proposed to open a clinic at the works, with a physician and a tuberculosis nurse in charge.

German Iron Trade Statistics

BERLIN, February 1, 1912.—The statistics of the German iron trade for the past five or six years show almost uninterrupted expansion from year to year. Both production and the export trade in pig iron have made big gains, while imports of pig iron have fallen off heavily. The following table gives, in metric tons, the production of pig iron, the exports, the imports, and the excess of exports over imports since the year 1906:

| Production. | Exports. | Imports. | Excess of exports over imports. |
|---------------------|----------|----------|---------------------------------|
| 1906.... 12,478,067 | 480,574 | 408,196 | + 72,378 |
| 1907.... 13,045,760 | 275,180 | 443,623 | - 168,443 |
| 1908.... 11,813,511 | 257,849 | 252,790 | + 5,059 |
| 1909.... 12,917,653 | 471,046 | 134,230 | + 336,816 |
| 1910.... 14,793,325 | 786,855 | 136,326 | + 650,529 |
| 1911.... 15,534,223 | 829,393 | 129,850 | + 699,543 |

The reversal of conditions in the foreign trade since the year 1900 has been most marked. In that year exports were only 129,409 tons, while imports amounted to 726,712 tons; the excess of imports over exports was 697,307 tons.

Taking account of the entire exports of iron in all forms, it is found that the excess of exports over imports amounted to 4,770,000 tons in 1911, to 4,310,000 tons in 1910, and to 3,590,000 tons in 1909. Net exports increased last year by 460,000 tons, whereas the gain in pig iron production was about 741,000 tons. Thus above 60 per cent. of last year's gain was taken by foreign countries.

The following table shows the exports of steel material (ingots, blooms, billets, etc.) and of steel rails and ties, in metric tons:

| Steel material. | Rails and ties. | 1909..... | 1910..... | 1911..... |
|------------------|-----------------|-----------|-----------|-----------|
| 1906.... 365,026 | 369,353 | 474,854 | 364,662 | |
| 1907.... 227,332 | 417,694 | 494,400 | 515,722 | |
| 1908.... 475,267 | 331,323 | 651,415 | 520,151 | |

From this table it appears that there has been a gain of 40 per cent. in the exports of rails and ties since 1906 and of 78 per cent. in steel material.

The next table shows the shipments of the Steel Works Union in fully syndicated products since 1908, in metric tons:

| Steel material | Rails and ties. | Structural shapes. | Total. |
|---------------------|-----------------|--------------------|-----------|
| 1908..... 1,391,000 | 2,071,000 | 1,303,000 | 4,764,000 |
| 1909..... 1,503,000 | 1,847,000 | 1,615,000 | 4,966,000 |
| 1910..... 1,524,000 | 1,878,000 | 1,805,000 | 5,207,000 |
| 1911..... 1,744,000 | 2,090,000 | 1,987,000 | 5,810,000 |

These figures show that shipments in all three classes of products were at high-water mark last year. The Union did not begin to publish statistics of shipments in other products till 1910. For the past two years the figures are as follows, in metric tons:

| | 1910. | 1911. |
|----------------------------|-----------|-----------|
| Bars..... | 3,380,013 | 3,709,579 |
| Wire rods..... | 733,285 | 802,360 |
| Plates..... | 981,950 | 1,107,398 |
| Tubing..... | 128,840 | 892,705 |
| Castings and forgings..... | 526,171 | 571,137 |
| Totals..... | 5,750,259 | 6,383,177 |

An Investigation of Iron Mining

Dwight E. Woodbridge, Duluth, is conducting interesting investigations in the Birmingham, Ala., district for the collection of material which will appear in a monograph to be issued by the Bureau of Mines, Washington. The bureau is planning a series of monographs covering the practical side of the mining industry of the United States, and is arranging with several engineers to carry out the work. Mr. Woodbridge will deal particularly with iron ore, and reports will be prepared by other engineers on matters connected with iron and steel metallurgy.

The iron ore inquiry will cover quite fully by description, photographs and drawings all methods for the mining of iron ore which are employed in any important way in the United States. Cost data will be presented; the methods of exploration, magnetic, diamond drill, etc., with costs; the beneficiation of iron ores at mines—washing, calcining, roasting, crushing, magnetic concentration, drying, nodulizing and sintering; also welfare, sanitation and kindred work which is being carried out or experimented with by various companies. Transportation methods and costs will be considered. Other matter will be presented pertaining entirely to the actual detail of iron mine opera-

tion, but not trenching upon the fields now covered by other branches of the Government service. The various monographs belonging to the series should form a compendium of practical knowledge of high value.

Van Dorn & Dutton Drills and Reamers

The Van Dorn & Dutton Company, Cleveland, Ohio, reports a material increase in the past few weeks in the demand for drills and reamers, indicating growing activity in bridge and structural operations, car building, etc. This company states that its Hard Service line of electric reamers is being used extensively in work on the Panama Canal, where the service required is said to be particularly exacting. An order has just been received from the McClintic-Marshall Construction Company for 24 reamers of type DC-3 for use in Panama Canal work. This is the third order from the same company for reamers for that work. A few months ago the McClintic-Marshall Company placed an order for 12 of the reamers, 6 of type DC-3 and about 6 of type DC-4. Later this order was duplicated. The Van Dorn & Dutton Company reports that their machines, by reason of their particular adaptability to the work required in motor cars and parts construction, together with their efficiency and mechanical and electrical qualities, are being largely used in the automobile industry. An order was recently received for 20 of the type DA-00 and 5 of the type DA-0 universal electric drills from the Hupp Motor Company, Detroit, Mich.; another was from the C. L. Wilson Body Company, Detroit, Mich., for 24 type DA-00 electric drills. Another recent order is from the Haskell & Barker Car Company, Michigan City, Ind., for 20 type DC-3 reamers for its new steel freight car shops. The company is also receiving quite a number of orders from Great Britain for machines of different types and sizes. One such order has just been completed for 20 machines of various sizes.

Copper Production and Stocks in January

The Copper Producers' Association this month furnishes a surprise to the trade. A reduction in stocks had been looked for, but the decline had been expected to be only moderate. The report, however, is almost sensational, as it shows a falling off in stocks of no less than 23,174,052 lb., thus running very much in excess of any of the estimates made by those who had supposed themselves well informed. The statement is as follows:

| | Pounds. |
|--|-------------|
| Stock of marketable copper of all kinds on hand at all points in the United States, January 1..... | 89,454,695 |
| Production of marketable copper in the United States from all domestic and foreign sources in January..... | 119,337,753 |
| Deliveries of marketable copper in January: | |
| For domestic consumption..... | 62,343,901 |
| For export..... | 80,167,904 |
| Total..... | 142,511,805 |
| Stock of marketable copper of all kinds on hand at all points in the United States, February 1..... | 66,280,643 |

Deliveries have been running ahead of consumption for the past four months consecutively. In this brief period stocks have declined 74,614,213 lb.

The Gifford Engine Company, Lansing, Mich., recently incorporated with a capital stock of \$50,000, will manufacture small high-grade gasoline engines of from one-half to one and one-half hp for farm and household use. The company engages in business with orders booked for about 300 engines. The officers of the company have all been connected with local gas engine factories. The president is W. Arthur Gifford; vice-president, R. N. Wilson; secretary, J. K. Reed; treasurer, F. L. Radford.

The Berwind Coal Company, Duluth, Minn., has purchased from J. L. Tomlinson a 47-acre tract in West Duluth for a site for a coal handling plant. It is stated that the company will begin the erection of a dock on which will be installed a large handling plant with the most modern equipment. This dock will have a storage capacity of 1,000,000 tons.

At a special meeting of the Cleveland Engineering Society February 27 an illustrated address on technical education will be made by Prof. J. B. Barker, principal of the Technical High School, Cleveland, Ohio.

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Low-Cost European Machinery

The pending proposal for a reduction of the tariff on machinery and other products of American metal-working establishments has caused a sharp revival of interest in the differences between manufacturing costs in this country and Europe. The element chiefly in question is labor; for, while prices of material, cost of transportation, etc., can be readily ascertained or else deduced from quotations in the world's markets, the matter of wages is not so easily arrived at. Next to wages, the other manifold and varied expenses of handling, including those which pertain to raw material, to parts in different stages of manufacture and to the finished products, exclusive of freight and delivery expense, form the most elusive and at times illusive bases of comparison.

It has also been a common fallacy of late, with the few economists who have attempted anything more than generalizations in this field, to make comparisons of wages founded upon certain grades of highly skilled labor and their productive capacity per diem. They have not taken into account the great differences in manufacturing conditions as a whole, between countries on the two sides of the ocean, and the exact relation which the higher priced machine shop labor bears in each case to the aggregate of wage earning in this particular branch of the metal-working industry. Nor is it a simple problem. In Germany alone, where the lines of competition are now more clearly drawn, with respect to the United States, than in any other European country, justification can be found for almost any measure of wage comparison by taking different shops throughout the empire.

In the better class of machinery building plants, where the equipment is similar to that of American plants and made up largely of American machinery, the rates for skilled work in the pattern shop, foundry, forge and machine shops will run from about 9c. to 26c. per hour, with a few men paid considerably more on piece work or as a result of long service. The average grade of skilled labor, from detailed figures gathered in the past year, would appear to be performed between the limits, roughly, of 12c. and 17c. Between 9c. and 12c., however, there are nearly as many or more men employed on operations which would be classed in this country as skilled labor, and then there are the large number of apprentices who have been very carefully taught and turn out, in many instances, work practically as good as that of the expert machinists or else render very efficient service as helpers. The unskilled shop labor is also of a high class.

Taking the men with the higher rates of wages, including the premium workers, and considering the fact that their output, even with the best machinery, is less proportionately than in American plants, the net difference, as compared with our shops, would not appear to be so great; but the average of wages paid in German establishments is brought far below American standards by the proportionately larger number of men and boys employed at low rates. It is this low-priced labor which still forms their main dependence and upon which their profits are made.

In addition it should be remembered—although that fact is generally overlooked in comparisons of this kind—that the wage list of a metal-working plant is not confined to men in the shops. A considerable

percentage of the whole finds employment in other capacities in and around the offices, power plant, storage buildings, shipping depot, yards, etc., and as cleaners, porters, teamsters and what not. All labor of this class, from the power plant attendants, who receive less than half what American companies pay for similar service, to the watchmen at the gates, is very much less expensive in Germany than in the United States; also, it is far more efficient, cutting the relative cost still more.

That brings us to the point that is almost utterly ignored, viz., that while American patternmakers, molders and machinists, particularly machinists, can show better results in production than those of any other nation, certain foreign countries have decidedly the advantage in respect to other grades of labor employed in or around metal working establishments. The significance of this in its effect upon wage comparisons is apparent at once when attention is called to it.

In the handling of material, in the generation and application of power, and in methods of distribution and marketing, the Germans and other Europeans have worked out systems which are generally much better than our own, and the elimination of waste of all kinds is remarkable. Furthermore, the syndicate plan of avoiding unnecessary competition and stimulating exports, with substantial encouragement from the government, operates to reduce still more the net costs of production.

As against these handicaps American machinery builders have only the advantages of better access to raw material, improved manufacturing methods resulting from specialization, superior designing skill in some lines and higher general efficiency of their best grades of mechanics.

That they have been able to maintain their position in this country, while paying high rates of wages, and produce a surplus for shipment abroad has been due to the protection of the domestic market against a flood of low-priced tools from Germany and other European countries. If it is asked why, when American manufacturers compete with these tools in Europe they need fear an invasion from them here, it may be said that such competition does not exist abroad. The American tools sold there are bought on merit, not price. There are many European plant owners, however, who prefer the lower priced machines, even if not so efficient; and the same tools would find plenty of customers in the United States if allowed to enter this market on anything like equal terms.

Southern Pig Iron on the Pacific Coast

The reduction in the freight rate on pig iron from the South to the Pacific coast, amounting to \$2.40 per ton, has directed the attention of pig-iron distributors anew to the possibilities of shipping domestic iron to that section in competition with pig iron from China and England, particularly the former. On the basis of \$10, Birmingham, Southern iron can be sold at Pacific coast points at a price of \$21.46 in competition with foreign at from \$21.50 to \$25. While from the standpoint of price it is thus possible to ship iron from the South, a number of considerations exist to prejudice the coast melters in favor of English and Chinese iron. In analysis the irons from abroad are

sufficiently high grade for both gray iron and malleable foundry use and vary sufficiently to cover a wide range of work; and, while the buying of foreign iron involves the disadvantage from the founder's standpoint that he must accept the entire shipment and pay cash for it on the arrival of a cargo, there is much less fluctuation in values and quotations are made for six months ensuing. In addition, foreign makers have shown a consistent eagerness for the business as contrasted with the natural disposition of domestic furnaces to seek business in that market only when prices are low and the Eastern markets are absorbing but little iron. The new rate to become effective March 11 may therefore result only in a reduction in the price of foreign iron, with a possibility of the local prejudice establishing a premium for the foreign product.

Steel Car Wheels

The steel car wheel may easily be said to have passed the experimental stage and to have reached the period of gradual adoption in place of the iron wheel for certain classes of service. The advocates of the steel wheel do not pretend that there are compelling arguments in favor of its adoption for all classes of service, but contend that it has clear advantages over the iron wheel for locomotive tenders, passenger train cars and freight cars of large capacity, as well as for all electric cars. For locomotive tenders and electric cars the adoption of the steel wheel is proceeding apace, and already it may almost be regarded as the standard type for this service. For passenger car trains the steel wheel is being adopted with considerable celerity; but for freight cars, while making distinct and continued progress, it is not tending towards general adoption altogether as rapidly as its early friends expected.

When a new article is offered which is both better and cheaper than the one in use the general adoption of the new article is fairly rapid; but even then there is considerable inertia on the part of users. The steel wheel is not cheaper, but dearer, and thus has a positive obstacle to overcome. There appears to be no serious question raised in any quarter, however, as to the steel wheel being the cheaper in the long run than the iron wheel; but the railroads are not to-day being operated in a purely scientific manner throughout. Computations that this or that article is more economical than another article, with the familiar "6 per cent. interest on the investment," are not necessarily conclusive with those who have the placing of the orders, because the sad fact is that each railroad does not have an unlimited fund of capital to draw from. To this unfortunate difficulty is added the fact that the best steel wheels which have been made are those which have been made latest, and they have not been in service long enough to furnish a large fund of experience.

The average freight car movement is about 23 miles per day, which gives 8400 miles per year. The average life of the cast-iron wheel is measured in tens of thousands of miles, while the claims for the steel wheel run into hundreds of thousands of miles, so that no good steel wheels have been worn out in freight car service. A few steel wheels have worn out, as shown by the fact that they have occasionally appeared in the scrap market, but those wheels were

the other kind. In passenger train service the annual mileage is much greater, but still experience with the different roads is relatively limited, and the steel wheel must be sold chiefly with claims based upon experience with particular railroads. This experience is not with wheels wearing out, but with the amount of wear which has occurred with given mileages, because the good wheels have not worn out. What is practically the standard steel car wheel allows for a total wear, including metal removed in re-turning, of $1\frac{3}{4}$ inches; while tests covering large numbers of wheels, not simply the most favorable tests, show wear, including loss by re-turning, or not over one inch per 100,000 miles. As a rule, this showing involves re-turning only after the 100,000 miles of service has been afforded, which means an initial service two and one-half to three times as great as the total service the iron wheel furnishes. The selling price of such steel wheels has declined, in common with other steel products, and may be taken at \$14 per wheel for wheels of this type, which is perhaps less than double the cost of an iron wheel safe to sustain a similar load.

The progress of the steel wheel towards general adoption may be considered as slow only by comparison with the very large field it aims to fill. The total number of iron wheels in service easily exceeds 10,000,000, so that to replace these with steel wheels would involve an investment perhaps much exceeding \$150,000,000. With so many demands upon them, the railroads cannot suddenly make this investment. While there are no comprehensive statistics, there is reason to believe that already there are not far from a million steel wheels in service, and the number may be somewhat above a million.

The Engineer and Accident Prevention

An argument that scientific accident prevention must be made the work of a specially trained man, such as the mechanical engineer, if the general existence of proper preventive measures is to be realized was a leading feature of an address made before the last meeting of the American Association for Labor Legislation by John Calder, general manager of the Remington Typewriter Works, Ilion, N. Y. The address in full, together with other papers on the prevention and reporting of industrial injuries, was printed in the American Labor Legislation Review, 1 Madison avenue, New York City, issued in December.

"Good safeguarding," said Mr. Calder, "does not progress far by imitation alone. It must be developed methodically like all the other plant processes. The provider of it must first make a painstaking study of the actual conditions under which the employees in any one plant perform each dangerous task. These under expert scrutiny sometimes prove to be very different from the prescribed or supposed conditions and are rarely precisely alike for the same machine in any two industries. The facts being ascertained beyond a doubt, the mechanical engineer has only to apply to the problem the trained faculties which he exercises daily in other directions and in most cases he will be able to frame standardized safety devices and safe-working precautions which can be readily adapted where necessary to the new requirements in the plants which are always presenting themselves."

Mr. Calder also emphasized the fact that the most serious casualty reports come in singly from the smaller or remoter plants not yet affected by the new movement for safeguarding workmen and that these less intelligent and less sympathetic employers constitute one of the factory inspector's greatest problems. With regard to safety committees, composed in part of workmen, he agreed that representation on such committees of the operatives, with

periodic change in personnel, was an excellent aid for locating accident risks in plants, but for scientific prevention it will be found necessary to make the engineers strictly responsible for the systematic provision of adequate safeguarding both in designing apparatus and after installing it.

C. W. Price, superintendent of welfare work, International Harvester Company, Chicago, and Fred C. Schwedtmann, chairman, industrial indemnity committee of the National Association of Manufacturers, were among those whose discussions of the papers were reported.

The Steel Corporation's Unfilled Orders

The increase in unfilled orders of the United States Steel Corporation in January was 294,960 tons, the total on January 31 being 5,379,721 tons, against 5,084,761 tons on December 31. It is understood that some of the larger rail orders taken by the corporation's mills in January are not included in the statement, since the formal contracts were not signed before the end of the month. The total of unfilled orders January 31 was the largest since that of March 31, 1910, which was 5,402,514. It is about twice the low-point record of 2,674,757 tons on December 31, 1910. The amounts reported by months, beginning with January, 1911, are as follows:

| | | | |
|---------------------|-----------|---------------------|-----------|
| Jan. 31, 1912..... | 5,379,721 | June 30, 1911..... | 3,361,058 |
| Dec. 31, 1911..... | 5,084,761 | May 31, 1911..... | 3,113,187 |
| Nov. 30, 1911..... | 4,141,955 | April 30, 1911..... | 3,218,704 |
| Oct. 31, 1911..... | 3,694,328 | Mar. 31, 1911..... | 3,447,301 |
| Sept. 30, 1911..... | 3,611,317 | Feb. 28, 1911..... | 3,400,543 |
| Aug. 31, 1911..... | 3,695,985 | Jan. 31, 1911..... | 3,110,919 |
| July 31, 1911..... | 3,584,085 | | |

The totals at the close of the various years have been as follows: 1902, 5,347,523 tons; 1903, 3,215,123 tons; 1904, 4,696,203 tons; 1905, 7,605,086 tons; 1906, 8,498,719 tons (the high record); 1907, 4,624,552 tons; 1908, 3,603,527 tons; 1909, 5,927,031 tons; 1910, 2,674,757 tons; 1911, 5,084,761 tons.

Pittsburgh Foundrymen's Association

Eliot A. Kebler, Pittsburgh resident agent of M. A. Hanna & Co., was the speaker at the February meeting of the Pittsburgh Foundrymen's Association February 5. William H. Wood, who was to have read a paper on "Brass," being unable to appear. Mr. Kebler presented a comprehensive view of the processes of iron and steel manufacture, beginning with the ore in the ground. He explained the various methods of mining iron ore and indicated the principal sources of supply in this country; described blast furnace construction and operation and defined the different kinds and grades of pig iron; then in turn described steel works operations and products. Samples were shown of castings of various kinds; also of the different rolling mill products.

An Oil Fired Converter Installation.—W. P. Taylor & Co., Buffalo, N. Y., have arranged for the installation of a $\frac{1}{2}$ ton Stock oil fired converter for the manufacture of steel castings. The plant will be in operation early in the coming summer. It will be of the type described in *The Iron Age* of September 7, 1911, and is erected with a guarantee as to cost of steel in the ladle ready for pouring, based on stated costs of pig iron, fuel and electric power. Guy J. Stock, inventor of this type of converter, who had been in the United States for several weeks, sailed recently for England.

The Warren Foundry & Machine Company held its annual meeting February 12 at Phillipsburg, N. J. The old directors were re-elected, and after organizing elected the following officers: William Runkle, president and treasurer; William H. Hulick, vice-president and assistant treasurer; S. A. Bristol, secretary.

At a meeting of the board of directors of the Lebanon Valley Iron & Steel Company, Lebanon, Pa., held January 29, Simon S. P. Light, formerly treasurer, was elected vice-president, and F. T. Davis, formerly connected with the Phoenix Iron Company, was elected secretary-treasurer.

James J. Hill a Stanley Witness

Ore Properties a Gift to Great Northern Stockholders

James J. Hill appeared before the Stanley Committee at Washington, Monday, February 12, and told the story of his acquisition of the so-called Great Northern iron ore properties in Minnesota. Much of it, in fact, practically all of it, has been given before and is familiar to all connected with Lake Superior iron mining. Mr. Hill referred first to the purchase from Wright & Davis, who operated a lumber railroad and owned a good deal of property on the Mesaba range. They held about 39,000 acres of ore lands. Learning that they were about to sell and might deal with the Lake Superior Consolidated Iron Mines, the Rockefeller company, Mr. Hill closed with Wright & Davis for all their properties at \$4,050,000. After acquiring various other properties, he formed the Lake Superior Company, Ltd., a holding company. Mr. Hill told further of the various ore lands turned over under his lease to the United States Steel Corporation. Some of these the Hill interests hold only in part. On some of them they turn over practically all the royalty to others. The Lake Superior Company, Ltd., was formed to hold the various properties in trust for the stockholders of the Great Northern Railroad. The Great Northern Railroad did not figure in the deal. Mr. Hill explained that the Lake Superior Company paid him back \$4,050,000 plus 5 per cent. interest.

"I bought the properties as an individual because as a railroad company I do not think the Great Northern would have the legal right to own and operate mines."

"But you, as president, could own and operate mines and distribute the stock to the railroad stockholders?" asked Chairman Stanley.

"Yes, or give it to the poor," said Mr. Hill.

Mr. Hill explained that Great Northern shareholders received ore certificates pro rata for their shares of Great Northern Railroad stock. There were no strings to these ore certificates. They cost the shareholders nothing. Each shareholder was free to do as he pleased with the certificates, hold or sell. Owners of the ore certificates were once identical with the Great Northern's shareholders. That is not now true. Some had sold. The Great Northern Road had nothing to do with the transaction, but the allotment of these ore certificates in their distribution was merely determined by the interest the beneficiaries had in the Great Northern Road through their ownership of its stock.

Referring to the cancellation of the lease by the United States Steel Corporation, Mr. Hill said that there was not less than 500,000,000 tons of ore left in the properties, and that he would not take less than \$1 a ton for it. "Ore doesn't go out of fashion," he said, "and the fire risks on ore are low." Then, with a recklessness of statement that has only been equaled by one other witness summoned before the Stanley Committee, he said: "Twenty years hence the Steel Corporation will not, I predict, have a peck of ore in its own beds. Don't make the mistake of thinking the Steel Corporation will have any monopoly after it surrenders our leases. The market value of the Hill is worth more than \$1 a ton. It can be sold for \$3.40 a ton. Suppose it costs 60 cents a ton to mine, 60 cents a ton for rail transportation, 65 cents a ton for lake hauling. That's \$1.85 a ton out of \$3.40, leaving an income of \$1.55 a ton. The rail rate is now about 80 cents a ton. It is the cheapest ore rate on earth. Next year that rate will be 60 cents a ton for the rail haul."

The Philadelphia Foundrymen's Association

The Philadelphia Foundrymen's Association held its regular monthly meeting at the Manufacturers' Club on the evening of February 7, with President Thomas Devlin in the chair. After the transaction of routine business a paper on "Sherardizing" was presented by Thomas Liggett, Jr., United States Sherardizing Company, New Castle, Pa., and illustrated by lantern slides. D. S. Patterson, Double Service Packing Company, Philadelphia, also presented a paper on "Flax Fiber and Its Use in the Packing Art." The meeting was well attended and the papers presented were of considerable interest.

Pittsburgh and Vicinity Business Notes

The stockholders of the New Castle Forge & Bolt Company, New Castle, Pa., have authorized the board of directors to appoint a committee with power to sell the plant at the best price obtainable. An effort will be made to dispose of it at private sale. At present it is only in partial operation.

The ninth annual banquet of the Manufacturers' Association of Pittsburgh will be held in the Union Club, Frick Building, this evening, February 15. The speakers include Director A. A. Hammerschlag of the Carnegie Technical Schools; Robert Garland of the Garland interests, Hon. James A. Adams and others. F. R. Babcock will act as toastmaster. Charles J. Mesta, Mesta Machine Company, is chairman of the Entertainment Committee.

Stack No. 3 of the Sharpsville Furnace Company at Sharpsville, Pa., has been blown out for repairs. A new furnace jacket will be built of heavier construction than the present one.

The Kanawha Mine Car Company, Charleston, W. Va., will make some additions to its plant, including a two-story building, 60x110 ft., and a one-story building, 55x58 ft. It is in the market for a number of motors and cranes to equip these buildings.

Members of the Amalgamated Association of Iron, Sheet and Tin Plate Workers are preparing a protest to Congress, to be signed by all the lodges, against the proposed reduction in the tariff on tin plate. The protest states that workers will have to accept a reduction in wages if the proposed bill is put into effect.

Word was received at the offices of Julian Kennedy, engineer, Pittsburgh, last week that the first steel had been rolled on the new blooming mill of the Tata Iron & Steel Company at Kalimati, India, on February 6. Mr. Kennedy is at present in India, superintending the starting of this plant.

No. 3 blast furnace of the Republic Iron & Steel Company at Haselton, Ohio, which was blown out about seven weeks ago for relining, was put in blast February 10.

John L. Mullen, constructing engineer, Union Bank Building, Pittsburgh, has been awarded a contract for the steel work of the E. W. Edwards department store building, Rochester, N. Y. The building will be 80x150 ft., 10 stories, and will require 1,500 tons.

The taking over of the Ohio Iron & Steel Company, Lowellville, Ohio, by the Youngstown Sheet & Tube Company, Youngstown, Ohio, has not yet been consummated but the deal will likely be put through within a very short time. The Sheet & Tube Company will erect some more finishing mills in connection with its open-hearth plant but definite plans regarding these mills have not yet been made.

A meeting of the recently organized Association of Sheet and Tin Plate Manufacturers was held in Pittsburgh February 13 to discuss the proposed reduction in the duty on sheets. No definite action was taken but it is probable that a committee will visit Washington to protest against any reduction in the present tariff. It is claimed that the reduction in duty would mean that labor in domestic sheet mills would have to take a reduction in wages to meet foreign competition.

Farrar & Treffts, manufacturers of steam engines, boilers, etc., Buffalo, N. Y., have just completed for the United States Government and shipped to various points on the Atlantic and Pacific coasts 11 automatic whistling acetylene lamp buoys with submarine bell attachment for harbor and channel use. These buoys are 10 ft. in diameter and 42 ft. long, and are so constructed that the rise and fall of the waves create a wind pressure by which the whistle is automatically blown. The bell is also sounded automatically by the action of the swell of the sea. The central tube of the buoy is filled with calcium carbide for the generation of acetylene gas, containing a sufficient supply to keep the light going continuously for 18 months without recharging and without requiring care or attention after the buoy is placed and lighted. These buoys represent a cost of \$60,000.

The Iron and Metal Markets

Further Rail Inquiries Car Shortage Becomes More Pronounced Tin Plate Buying by Oil Companies—Lower Prices on Certain Finished Products

There is a tendency to exaggerate the extent and effect of the present lull in new buying of steel products, just as there was an unwarranted proclamation of a boom, based on the heavy buying of the last six weeks of 1911. The check given to all business by the severe winter has been felt in the iron industry in the slackening of new orders and, in some cases, of specifications. But there is a general expectation of expanding demand in the opening of the active season.

The statement of the Steel Corporation showing a gain of 294,000 tons in unfilled orders was favorably regarded in the steel trade, however it was received in certain circles which seem to have set a high figure with the purpose of creating a disappointment.

With the starting up of another blast furnace at Gary, all the eight stacks there are now in blast. Bookings by the largest producer in the Chicago district were much heavier in January than in December, and with the starting of the Gary rail mill February 26 that plant will be in full operation.

That the rails bought in the past two months have not been coming to the mills as fast as desired is one feature of the situation that has caused some comment. Against it is the prospect that considerable rail buying is ahead, particularly for Western and Southwestern lines, in accordance with financial programmes recently announced. The Wabash receivers have asked for bids on 3500 cars, 50 locomotives and 25,000 tons of rails. The International Great Northern is inquiring for 15,000 tons. In girder rails a 4000-ton inquiry from the Chicago City Railways is pending. Quite a little export business is up, including 20,000 tons for Australia, a part of the 150,000 tons which will be needed for the Australian Transcontinental Railway.

Surface indications as to new cars do not reflect real conditions, according to some authorities, who predict very considerable orders on an early buying movement. Complaints of crippled car service are growing and the causes appear to be deeper and more lasting than winter weather.

Reports from all markets agree that prices in a number of finished lines are lower, particularly in plates, structural shapes, bars and sheets. There is no large inflow of new orders, but some mills not so well supplied with specifications as the larger ones are rather more aggressive. No. 28 black sheets have declined to 1.85c. and in a few cases 1.80c. has been done.

In structural work competition breaks out at intervals with new sharpness, and that has been the case lately. Volume is not seriously complained of, and in the past week probably 35,000 tons has been closed. Railroad contracts include 5000 tons for the Santa Fé, 2400 tons for the Spokane, Portland & Seattle, 3000 tons for the New York Subway, and 1500 tons for the Pennsylvania Lines West. At Philadelphia three buildings just let, including the Bellevue-Stratford addition and the Stock Exchange, call for about 5500 tons, and the Manufacturers' Club, 2000 tons, is about closed.

Various Standard Oil Company fragments have been in the market for tin plates. Welsh makers recently bid on 100,000 boxes, but did not secure the business. An independent producer in the Pittsburgh district has been a seller to the oil companies, it is understood. Since there is no drawback on wastage, domestic tin plate mills have a protection of about 20 cents a box against Welsh tin plates in re-export business.

Southern pig iron producers find the firmer position they have recently taken on prices reinforced by a reduction of 17,000 tons in Alabama stocks in January. The Northern foundry iron market is dominated by the expectation of buyers that with lower ore prices there will be a further recession in pig iron, and it may be April before the ore situation clears up.

Steel-making iron is quiet, with no definite development as to purchases in the market by the leading interest. At Pittsburgh a recent purchase of 10,000 to 12,000 tons is reported at slightly under \$12.25 at furnace.

It is certain that the Lake iron ore shipments in 1912 will be much larger than for last year. Out of all the fencing over shipments of Lake Superior ores into eastern Pennsylvania districts very little business is expected, as Cleveland ore firms could not give Eastern buyers the low price they must have without giving it also to their Central Western customers, and such a reduction from the 1911 basis is not expected.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

| Pig Iron, Per Gross Ton: | Feb. 14, 1912. | Feb. 7, 1912. | Jan. 10, 1912. | Feb. 15, 1911. |
|--|-------------------|------------------|-------------------|-------------------|
| Foundry No. 2 standard, Philadelphia | \$14.85 | \$14.85 | \$14.85 | \$15.50 |
| Foundry No. 2, Valley furnace | 13.00 | 13.00 | 13.00 | 13.75 |
| Foundry No. 2 Southern, Cincinnati | 13.25 | 13.25 | 13.25 | 14.25 |
| Foundry No. 2, Birmingham, Ala. | 10.00 | 10.00 | 10.00 | 11.00 |
| Foundry No. 2, at furnace, Chicago* | 14.00 | 14.00 | 14.00 | 15.50 |
| Basic, delivered, eastern Pa. | 14.25 | 14.25 | 14.25 | 14.50 |
| Basic, Valley furnace | 12.25 | 12.25 | 12.50 | 13.75 |
| Bessemer, Pittsburgh | 14.90 | 14.90 | 15.15 | 15.90 |
| Gray forge, Pittsburgh | 13.40 | 13.40 | 13.40 | 14.40 |
| Lake Superior charcoal, Chicago | 16.00 | 16.00 | 16.00 | 17.50 |

| Billets, etc., Per Gross Ton: | 20.00 | 20.00 | 20.00 | 23.00 |
|---|-------|-------|-------|-------|
| Bessemer billets, Pittsburgh | 20.00 | 20.00 | 20.00 | 23.00 |
| Open hearth billets, Pittsburgh | 28.00 | 28.00 | 28.00 | 28.00 |
| Forging billets, Pittsburgh | 22.40 | 22.40 | 22.40 | 25.40 |
| Open hearth billets, Philadelphia | 25.00 | 25.00 | 24.00 | 29.00 |
| Wire rods, Pittsburgh | | | | |

| Old Material, Per Gross Ton: | 15.00 | 15.00 | 15.00 | 15.50 |
|-------------------------------------|-------|-------|-------|-------|
| Iron rails, Chicago | 16.00 | 16.00 | 16.50 | 17.50 |
| Iron rails, Philadelphia | 13.00 | 13.00 | 13.25 | 13.00 |
| Car wheels, Chicago | 12.00 | 12.00 | 12.50 | 13.50 |
| Car wheels, Philadelphia | 12.25 | 12.25 | 13.00 | 14.50 |
| Heavy steel scrap, Pittsburgh | 10.50 | 10.50 | 10.50 | 11.75 |
| Heavy steel scrap, Chicago | 11.75 | 11.75 | 12.25 | 14.00 |
| Heavy steel scrap, Philadelphia .. | | | | |

| Finished Iron and Steel, | Per Pound to Largest Buyers: | Cents. | Cents. | Cents. | Cents. |
|-------------------------------------|------------------------------|--------|--------|--------|--------|
| Bessemer rails, heavy, at mill .. | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Iron bars, Philadelphia | 1.27½ | 1.27½ | 1.27½ | 1.35 | 1.35 |
| Iron bars, Pittsburgh | 1.25 | 1.25 | 1.25 | 1.35 | 1.35 |
| Iron bars, Chicago | 1.15 | 1.15 | 1.15 | 1.30 | 1.30 |
| Steel bars, Pittsburgh | 1.15 | 1.15 | 1.15 | 1.40 | 1.40 |
| Steel bars, tidewater, New York .. | 1.31 | 1.31 | 1.31 | 1.56 | 1.56 |
| Tank plates, Pittsburgh | 1.12½ | 1.12½ | 1.15 | 1.40 | 1.40 |
| Tank plates, tidewater, New York .. | 1.28½ | 1.28½ | 1.31 | 1.56 | 1.56 |
| Beams, Pittsburgh | 1.12½ | 1.12½ | 1.15 | 1.40 | 1.40 |
| Beams, tidewater, New York .. | 1.28½ | 1.28½ | 1.31 | 1.56 | 1.56 |
| Angles, Pittsburgh | 1.12½ | 1.12½ | 1.15 | 1.40 | 1.40 |
| Angles, tidewater, New York .. | 1.28½ | 1.28½ | 1.31 | 1.56 | 1.56 |
| Skelp, grooved steel, Pittsburgh .. | 1.12½ | 1.12½ | 1.15 | 1.30 | 1.30 |
| Skelp, sheared steel, Pittsburgh .. | 1.20 | 1.20 | 1.20 | 1.35 | 1.35 |

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

| Sheets, Nails and Wire, | Feb. 14, 1912. | Feb. 7, 1912. | Jan. 10, 1912. | Feb. 15, 1911. |
|------------------------------------|-------------------|------------------|-------------------|-------------------|
| Per Pound to Largest Buyers: | Cents. | Cents. | Cents. | Cents. |
| Sheets, black, No. 28, Pittsburgh | 1.85 | 1.90 | 1.90 | 2.20 |
| Wire nails, Pittsburgh | 1.60 | 1.60 | 1.55 | 1.75 |
| Cut nails, Pittsburgh | 1.55 | 1.55 | 1.50 | 1.60 |
| Fence wire, ann'led, 0 to 9, P'gh. | 1.40 | 1.40 | 1.35 | 1.55 |
| Barb wire, galv., Pittsburgh | 1.90 | 1.90 | 1.85 | 2.05 |

Coke, Connellsville,

| | | | | |
|-------------------------------|--------|--------|--------|--------|
| Per Net Ton, at Oven: | | | | |
| Furnace coke, prompt shipment | \$1.80 | \$1.80 | \$1.85 | \$1.45 |
| Furnace coke, future delivery | 1.80 | 1.80 | 1.70 | 1.60 |
| Foundry coke, prompt shipment | 2.10 | 2.00 | 1.90 | 2.00 |
| Foundry coke, future delivery | 2.20 | 2.10 | 2.10 | 2.25 |

Metals,

| | | | | |
|----------------------------------|--------|--------|--------|--------|
| Per Pound: | Cents. | Cents. | Cents. | Cents. |
| Lake copper, New York | 14.37½ | 14.25 | 14.62½ | 12.75 |
| Electrolytic copper, New York | 14.25 | 14.00 | 14.50 | 12.37½ |
| Spelter, St. Louis | 6.55 | 6.40 | 6.35 | 5.42½ |
| Spelter, New York | 6.70 | 6.55 | 6.50 | 5.57½ |
| Lead, St. Louis | 3.97½ | 3.90 | 4.35 | 4.30 |
| Lead, New York | 4.00 | 4.00 | 4.45 | 4.45 |
| Tin, New York | 44.00 | 44.00 | 43.50 | 45.75 |
| Antimony, Hallett, New York | 7.50 | 7.50 | 7.60 | 7.75 |
| Tin plate, 100-lb. box, New York | \$3.64 | \$3.64 | \$3.64 | \$3.94 |

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb., New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific Coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.12½c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates, up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

| Extras. | Cents per lb. |
|---|---------------|
| Gauges under ¼ in. to and including 3-16 in. on thinnest edge | .10 |
| Gauges under 3-16 in. to and including No. 8 | .15 |
| Gauges under No. 8 to and including No. 9 | .25 |
| Gauges under No. 9 to and including No. 10 | .30 |
| Gauges under No. 10 to and including No. 12 | .40 |
| Sketches (including all straight taper plates) 3 ft. and over in length | .10 |
| Complete circles, 3 ft. in diameter and over | .20 |
| Boiler and flange steel | .10 |
| "A. B. M. A." and ordinary firebox steel | .20 |
| Still bottom steel | .30 |
| Marine steel | .40 |
| Locomotive firebox steel | .50 |
| Widths over 100 in. up to 110 in., inclusive | .05 |
| Widths over 110 in. up to 115 in., inclusive | .10 |
| Widths over 115 in. up to 120 in., inclusive | .15 |
| Widths over 120 in. up to 125 in., inclusive | .25 |
| Widths over 125 in. up to 130 in., inclusive | .50 |
| Widths over 130 in. | 1.00 |
| Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive | .25 |
| Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive | .50 |
| Cutting to lengths or diameters under 1 ft. | 1.55 |
| No charge for cutting rectangular plates to lengths 3 ft. and over. | |

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in., and angles, 3 to 6 in. on one or both legs, ¼ in. and over, 1.12½c. Other shapes and sizes are quoted as follows:

| | Cents per lb. |
|---|---------------|
| I-beams over 15 in. | 1.20 to 1.25 |
| H-beams over 18 in. | 1.20 to 1.35 |
| Angles over 6 in. | 1.20 to 1.25 |
| Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card Sept. 1, 1909 | 1.20 to 1.25 |
| Tees, 3 in. and up | 1.20 to 1.25 |
| Zees, 3 in. and up | 1.15 to 1.20 |
| Angles, channels and tees, under 3 in., plus full extras as per steel bar card Sept. 1, 1909 | 1.20 to 1.25 |
| Deck beams and bulb angles | 1.45 to 1.50 |
| Hand rail tees | 2.00 to 2.15 |
| Checkered and corrugated plates | 2.00 to 2.15 |

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows:

| Blue Annealed Sheets. | Cents per lb. |
|-----------------------|---------------|
| Nos. 3 to 8 | 1.25 to 1.30 |
| Nos. 9 and 10 | 1.35 to 1.40 |
| Nos. 11 and 12 | 1.40 to 1.45 |
| Nos. 13 and 14 | 1.45 to 1.50 |
| Nos. 15 and 16 | 1.55 to 1.60 |

Box Annealed Sheets, Cold Rolled.

| | One Pass. | Three Pass. |
|--------------------|--------------|--------------|
| Nos. 10 to 12 | 1.50 to 1.55 | 1.85 to 1.90 |
| Nos. 13 and 14 | 1.55 to 1.60 | 1.95 to 2.00 |
| Nos. 15 and 16 | 1.60 to 1.65 | 2.10 to 2.15 |
| Nos. 17 to 21 | 1.65 to 1.70 | 2.25 to 2.30 |
| Nos. 22, 23 and 24 | 1.70 to 1.75 | 2.35 to 2.40 |
| Nos. 25 and 26 | 1.75 to 1.80 | 2.55 to 2.60 |
| No. 27 | 1.80 to 1.85 | 2.70 to 2.75 |
| No. 28 | 1.85 to 1.90 | 2.85 to 2.90 |
| No. 29 | 1.90 to 1.95 | 2.95 to 3.00 |
| No. 30 | 2.00 to 2.05 | 3.15 to 3.20 |

Galvanized Sheets of Black Sheet Gauge.

| Nos. 10 and 11 | 1.85 to 1.90 |
|--------------------|--------------|
| Nos. 12, 13 and 14 | 1.95 to 2.00 |
| Nos. 15, 16 and 17 | 2.10 to 2.15 |
| Nos. 18 to 22 | 2.25 to 2.30 |
| Nos. 23 and 24 | 2.35 to 2.40 |
| Nos. 25 and 26 | 2.55 to 2.60 |
| No. 27 | 2.70 to 2.75 |
| No. 28 | 2.85 to 2.90 |
| No. 29 | 2.95 to 3.00 |
| No. 30 | 3.15 to 3.20 |

All above rates on sheets are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2½-in corrugations:

Corrugated Roofing Sheets Per Square.

| Gauge. | Painted. | Galvanized. | Gauge. | Painted. | Galvanized. |
|--------|----------|-------------|--------|----------|-------------|
| 29 | 2.20 | 2.25 | 23 | 2.25 | 3.35 |
| 28 | 1.30 | 2.45 | 22 | 2.40 | 3.50 |
| 27 | 1.40 | 2.50 | 21 | 2.60 | 3.85 |
| 26 | 1.50 | 2.55 | 20 | 2.85 | 4.15 |
| 25 | 1.70 | 2.90 | 18 | 3.80 | 5.40 |
| 24 | 1.95 | 3.00 | 16 | 4.55 | 6.25 |

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$25. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.40; galvanized, \$1.70. Carload lots, to retailers, annealed, \$1.50; galvanized, \$1.80. Galvanized barb wire to jobbers, \$1.90; painted, \$1.60. Wire nails, to jobbers, \$1.60.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

| Fence Wire, Per 100 Lb. | Nos. | 0 to 9 | 10 | 11 | 12 & 12½ | 13 | 14 | 15 | 16 |
|-------------------------|------|--------|--------|--------|----------|--------|--------|--------|--------|
| Annealed | ... | \$1.55 | \$1.60 | \$1.65 | \$1.70 | \$1.80 | \$1.90 | \$2.00 | \$2.10 |
| Galvanized | ... | 1.85 | 1.90 | 1.95 | 2.00 | 2.10 | 2.20 | 2.60 | 2.70 |

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from December 1, 1911:

Butt Weld.

| | Steel | | Iron | |
|------------------|--------|-------|--------|-------|
| | Black. | Galv. | Black. | Galv. |
| ¼ and ¾ in. | 74 | 54 | 68 | 48 |
| ¾ in. | 75 | 65 | 69 | 59 |
| 1 in. | 78 | 68 | 72 | 62 |
| ¾ to 1½ in. | 81 | 72 | 75 | 67 |
| 2 to 3 in. | 82 | 75 | 76 | 69 |

Lap Weld.

| | | | | |
|---------------|----|----|----|----|
| 1½ and 1¾ in. | 79 | 72 | 68 | 61 |
| 2 in. | 79 | 72 | 72 | 65 |
| 2½ to 4 in. | 81 | 74 | 74 | 67 |
| 4½ to 6 in. | 80 | 72 | 73 | 65 |
| 7 to 12 in. | 78 | 68 | 71 | 61 |
| 13 to 15 in. | 55 | .. | 47 | .. |

Butt Weld, extra strong, plain ends, card weight.

| | | | | |
|-----------------------|----|----|----|----|
| 1/4, 1/4, 3/4 in..... | 70 | 60 | 65 | 55 |
| 1/2 in..... | 75 | 69 | 70 | 64 |
| 3/4 to 1 1/2 in..... | 79 | 73 | 74 | 68 |
| 2 to 3 in..... | 80 | 74 | 75 | 69 |

Lap Weld, extra strong, plain ends, card weight.

| | | | | |
|-----------------|----|----|----|----|
| 1½ in..... | 76 | 70 | 71 | 65 |
| 2 in..... | 78 | 72 | 73 | 67 |
| 2½ to 4 in..... | 77 | 71 | 72 | 66 |
| 4½ to 6 in..... | 70 | 60 | 65 | 55 |
| 7 to 8 in..... | 70 | 60 | 65 | 55 |
| 9 to 12 in..... | 65 | 55 | 60 | 50 |

Butt Weld, double extra strong, plain ends, card weight.

| | | | | |
|-----------------|----|----|----|----|
| ¾ in..... | 63 | 59 | 60 | 54 |
| ¾ to 1½ in..... | 68 | 62 | 63 | 57 |
| 2 to 3 in..... | 70 | 64 | 65 | 59 |

Lap Weld, double extra strong, plain ends, card weight.

| | | | | |
|-----------------|----|----|----|----|
| 2 in..... | 66 | 60 | 61 | 55 |
| 2½ to 4 in..... | 68 | 62 | 63 | 57 |
| 4½ to 6 in..... | 67 | 61 | 62 | 56 |
| 7 to 8 in..... | 60 | 50 | 55 | 45 |

Plugged and Reamed.

| 1 to 1½, 2 to 3 in. Butt Weld | Will be sold at two (2) points lower basing (higher price) than merchants' or card weight pipe. Butt or lap weld as specified. |
|-------------------------------|--|
| 2, 2½ to 4 in. Lap Weld | |

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

| Steel. | Standard Charcoal Iron. |
|--|-------------------------------------|
| 1½ to 2¼ in.....65 | 1½ in.....48 |
| 2½ in.....67½ | 1¾ to 2¼ in.....50 |
| 2¾ to 3¼ in.....72½ | 2½ in.....55 |
| 3½ to 4 in.....75 | 2¾ to 5 in.....60 |
| 5 to 6 in.....67½ | Locomotive and steamship |
| 7 to 13 in.....65 | special grades bring higher prices. |
| 2½ in. and smaller, over 18 ft., 10 per cent. net extra. | |
| 2¾ in. and larger, over 22 ft., 10 per cent. net extra. | |

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f. o. b. mill at Pittsburgh basing discounts, lowered by two points.

Pittsburgh

PITTSBURGH, PA., February 13, 1912.

Large steel interests report that specifications against contracts in the first half of February showed a falling off as compared with the first half of January, and shipments by the mills at present are considerably in excess of specifications. No doubt the extreme cold weather of the past two months, which has practically tied up the country districts, is partly responsible for the falling off in new orders and specifications, and it is believed that about March 15 or very shortly after, there will be a material increase in business. In the past week the Carnegie Steel Company has started up a second Isabella furnace, making 51 of its 59 stacks in blast, those idle being Edith, Neville, Zanesville, Steubenville, Niles, No. 1 Mingo, one Isabella and one Edgar Thomson. The company is now operating practically full all its open hearth plants and Bessemer works, with the single exception of Mingo Junction, which is down on account of an accident. The Jones & Laughlin Steel Company has started one blast furnace at Aliquippa and has three Talbot open hearth furnaces on, the fourth being scheduled to start this week. A second blast furnace at Aliquippa may go in about March 1. There is some uneasiness in the trade over the falling off in specifications and the further fact that prices on some forms of finished iron and steel, such as plates, structural material and steel bars are weaker. When the leading interest put its price on sheets to the basis of 1.90c. on No. 28 black on December 11, this price was pretty well held for a time by all the mills, but recently the market has softened and all sheets are about \$1 a ton lower. Consumers of billets and sheet bars are covered through first quarter, and are not showing any disposition to buy into second quarter. The coke market is fairly active with supply better, and premiums on prompt blast furnace coke have about disappeared. The scrap market is in a rut, with prices weak. The whole situation is less satisfactory, not only from the standpoint of specifications and new orders, but also of prices.

Pig Iron.—The local market is extremely quiet and no large inquiries are out. Consumers of pig iron are buying only in small lots to cover actual needs, believing the market may be lower later on. A sale is reported of 300 tons of Northern No. 2 foundry for March, April and May at \$13, Valley furnace, and 100 tons of Bessemer for March shipment at \$14, Valley furnace. The Pittsburgh Steel Company is credited with having bought 10,000 to 12,000 tons of basic iron for March delivery from a local interest at a price slightly under \$12.25 at furnace. We quote: Bessemer, \$14; basic, \$12.25; malleable Bessemer, \$12.75 to \$13; No. 2 foundry, \$13; gray forge, \$12.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel Billets and Sheet Bars.—Hardly enough new business is being offered in billets and bars to test the market, as consumers are pretty well covered through first quarter and are not disposed to contract into second quarter, owing to the uncertain outlook. We quote: Bessemer and open hearth billets, 4 x 4 in., up to 0.25 carbon, \$20; Bessemer and open hearth sheet and tin plate bars, \$21; forging billets, \$28, all at Pittsburgh. Prices of billets and sheet bars at Youngstown are 50c. under Pittsburgh and on very desirable orders \$1 under might be done.

Ferromanganese.—Most consumers are covered up to July 1, and some of the larger companies through the whole of this year, so that new buying is light and in small lots for prompt shipment. A sale of two carloads for March delivery is reported at the full price

of \$41, Baltimore, which is reported to be firmly held, the freight rate to Pittsburgh being \$1.95 a ton.

Ferrosilicon.—The market on 50 per cent. is strong, and a sale of two cars of about 50 tons each was made here last week at the full price of \$70. Most consumers are covered for some time ahead, and new inquiry is light. We quote 50 per cent. in lots up to 100 tons at \$70; over 100 tons to 600 tons \$69 and over 600 tons \$68, Pittsburgh. The lower grades are ruling at about \$20 for 10 per cent.; \$21 for 11 per cent.; \$22 for 12 per cent. f.o.b. cars at furnace, Ashland, Ky., or Jackson, Ohio.

Muck Bar.—There is no new inquiry, and in the absence of actual sales we quote best grades of muck bar, made from all pig iron at \$28, Pittsburgh.

Wire Rods.—Most consumers of rods are covered by contracts against which specifications are coming in at a fairly satisfactory rate. We note a sale of 100 tons of open-hearth rods at \$25. Pittsburgh, for prompt shipment.

Skelp.—The market is quiet, but mills rolling skelp have a fair amount of tonnage on their books. We quote grooved steel skelp at 1.12½c.; sheared steel skelp, 1.20c.; grooved iron skelp, 1.42c. to 1.45c., and sheared iron skelp, 1.62½c. to 1.65c., all for delivery at buyers' mills in the Pittsburgh district.

Steel Rails.—Of the Baltimore & Ohio order for rails, the Carnegie Steel Company will receive 11,000 tons, and of the Norfolk & Western order 12,000 tons, these rails to be rolled at the Edgar Thomson mills at Bessemer, Pa., or at the Ohio works at Youngstown, Ohio. Demand for light rails continues fairly active, the Carnegie Steel Company having received in the past week new orders and specifications for about 2500 tons. Some heavy orders for splice bars will soon be placed by the Baltimore & Ohio and Norfolk & Western, Pennsylvania and Pittsburgh & Lake Erie roads for the rails which they have recently bought. We quote splice bars at 1.50c. per lb., and repeat quotations on rails: Standard sections, 1.25c. per lb.; 8 and 10-lb. light rails, 1.25c.; 12 and 14-lb., 1.16c.; 16, 20 and 25-lb., 1.12c.; 30 and 35-lb., 1.10c., and 40 and 45-lb., 1.08c., f.o.b. at mill.

Plates.—New car orders are very light, the only one placed in the past week being for 600 ballast cars for the Northern Pacific given to the Canadian Car & Foundry Company at Montreal, Can., the plates and shapes to be rolled by the Carnegie Steel Company. The Bessemer & Lake Erie is expected to buy 1500 gondola and 500 box cars, and the Western Maryland will likely place next week 1000 gondolas, 1000 box and 750 hopper cars. The Rock Island is in the market for 700 general service gondolas; the Canadian Pacific for 400 gondolas and the Northern Pacific for 1500 to 2000 box cars. The Pressed Steel Car Company is filling an order for 30 electric motor cars for the New York, West Chester & Boston Railway, of very heavy design. They are 70 ft. long and will seat 80 passengers. The Toledo Shipbuilding Company, Toledo, Ohio, has contracts for two freighters, and the plates, about 1300 tons for each boat, will be furnished by the Carnegie Steel Company, which will also furnish 1500 tons of plates for a steel barge for the Standard Oil Company. Prices on plates are weaker, and we quote ¼-in. and heavier plates at 1.12½c., while on small lots 1.15c. is quoted. On very desirable orders 1.10c. at mills could be done.

Steel Wheels.—The use of steel wheels for freight cars is steadily increasing. The Pennsylvania Railroad has specified steel wheels for 4000 cars for eastern and western lines. The Norfolk & Western has specified steel wheels for 500 cars and the Delaware, La. k-awanna & Western for 500 cars, the Rock Island for 100 cars and the Armour Lines for 100 cars. The Pullman Palace Car Company has also practically adopted steel wheels for all the cars it will build in the future. A good part of the above orders will be rolled by the Carnegie Steel Company.

Sheets.—Specifications against contracts for sheets in January were very heavy and are expected to be fully as large this month. The market is quiet, as nearly all consumers covered for some time ahead in December and have been specifying against contracts. A charter has been issued to the Association of Sheet and Tin Plate Manufacturers, and offices have been opened in room 802, Frick Building. It is stated that the intention is to try to correct some abuses that have crept into the trade and to take united action looking to the safety of employees, but that in no way will attempts be made to control prices. The sheet mills continue to operate to about 85 per cent. of capacity.

but prices are showing some weakness. We quote No. 28 gauge box annealed black sheets at 1.85c. at mill, but on very desirable orders some mills have gone as low as 1.80c. at mill.

Structural Material.—Considerable work has been placed in the past week and a good deal is pending. It is claimed that in some cases the lowest prices ever named on fabricated work are being made at present and competition is the fiercest ever known. The American Bridge Company has taken 1500 tons of bridge work for the Pennsylvania Lines West. The Riverside Bridge Company has taken 800 tons for a hospital building in Philadelphia and the Riter-Conley Mfg. Company 300 tons for additions to the buildings of the Aluminum Company of America at New Kensington, Pa., and 1000 tons for new buildings for the Eastman Kodak Company at Rochester, N. Y. Prices on plain material are weaker and we quote beams and channels up to 15 in. at 1.10c. to 1.15c., Pittsburgh.

Tin Plate.—New buying of tin plate is extremely light, this being the off season, but specifications are coming in at a fairly satisfactory rate. One leading maker reports that its specifications on Monday were the heaviest for any one day in its history. The American Sheet & Tin Plate Company is running its larger tin plate mills to full capacity, and is running as a whole to about 85 per cent. Some of the independent tin plate mills are running to practically 100 per cent. of capacity, and the situation as regards operations is referred to as quite satisfactory. On the very small orders that are being placed \$3.40 per base box is being quoted, but on larger orders as low as \$3.25 is being done. We therefore quote 14 x 20 coke plates at \$3.25 to \$3.40, depending on the size of the order and deliveries wanted.

Iron and Steel Bars.—The larger makers of steel bars report that new orders are light, but that specifications on the heavy contracts placed some time ago are coming in at a fairly satisfactory rate. There has been an enormous increase in capacity for making steel bars in the past two years, and it takes a very heavy consumption to keep the mills full of work. The severe weather of the past two months has practically stopped all outdoor work, and this is interfering materially with consumption. We note that prices on both iron and steel bars are not as firm as they have been, and on very desirable orders for steel bars 1.10c. at mill has been accepted for reasonably prompt shipment. We quote steel bars at 1.15c. for delivery in first quarter and iron bars at 1.25c. f.o.b. at mill, Pittsburgh.

Hoops and Bands.—Only small new orders are being placed and specifications against contracts are coming in at only a fairly satisfactory rate. We quote steel bands at 1.10c. to 1.15c., extras per the steel bar card and hoops at 1.25c., f.o.b. Pittsburgh.

Rivets.—A fair amount of new business is being placed and consumers are specifying in a moderate way against contracts. We quote structural rivets at 1.50c. and boiler rivets at 1.60c., f.o.b. Pittsburgh. On very desirable orders these prices would be shaded about 5c. per 100 lb.

Railroad Spikes.—There is little new buying, but the railroads are specifying at a fairly satisfactory rate against the contracts they placed some time ago. We quote railroad spikes in base sizes at \$1.40 per 100 lb., in carload and larger lots, but on very desirable orders \$1.35 per 100 lb. is being named.

Merchant Steel.—New business is confined mostly to small lots and specifications against contracts have shown a falling off so far this month as compared with the same period in January. Regular prices, which are more or less shaded on desirable orders, are as follows: Iron finished tire, 1½ x ¾ in. and larger, 1.15c., base; planished tire, ½ in. and larger, 1.35c.; channel tire, ¾ in. and 1 in., 1.65c.; toe calk, 1.70c., base; flat sleigh shoe, 1.25c.; concave or convex, 1.55c.; cutter shoe tapered or bent, 2.15c.; spring steel, 1.75c.; machinery steel, smooth finish, 1.50c., all f.o.b. at mill.

Spelter.—The market is reported firm with futures quoted at about 6.25c. and prompt about 6.40c., East St. Louis, for prime Western grades, the freight rate for delivery in the Pittsburgh district being 12½c. per 100 lb.

Wire Products.—Only small scattering orders are being placed for wire and wire nails, all consumers having covered for some time ahead prior to the last advance in prices. Specifications are reported to be coming in at a fairly satisfactory rate. It is claimed regular prices are being maintained, but not enough new business is being placed to test the market. We quote wire nails, \$1.60; cut nails, \$1.55; galvanized barb wire,

\$1.90; painted, \$1.60; annealed fence wire, \$1.40, and galvanized fence wire, \$1.70, f.o.b. Pittsburgh, usual terms, freight added to point of delivery.

Merchant Pipe.—One of the leading natural gas companies is reported to have closed with a local pipe mill for 40 miles of 12-in. pipe and another gas interest has placed about 20 miles of 12-in. New demand for merchant pipe so far this year is heavier than usual at this season, one leading concern reporting a heavy increase in actual orders sent to the mills for January and the first half of this month as compared with the same period last year. Regular discounts on iron and steel pipe are reported as being fairly well held, but prices on line pipe are still being cut.

Tubes.—The railroads are specifying liberally against contracts, but new demand is only for small lots. Merchant tubes are very quiet and prices are more or less shaded.

Iron and Steel Scrap.—The local market is very quiet, consumers evidently being covered and are indifferent about taking in more material even when it is offered at low prices. A local consumer continues to pick up odd lots of selected heavy steel scrap at \$12.50 to \$12.75, delivered. Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, unless otherwise noted:

| | |
|---|--------------------|
| Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery | \$12.25 to \$12.50 |
| No. 1 foundry cast | 12.50 to 12.75 |
| No. 2 foundry cast | 10.25 to 10.50 |
| Bundled sheet scrap, f.o.b. consumers' mill, Pittsburgh district | 10.75 to 11.00 |
| Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa. | 12.50 to 12.75 |
| No. 1 railroad malleable stock | 11.25 to 11.50 |
| Grate bars | 9.00 to 9.25 |
| Low phosphorus melting stock | 15.25 to 15.50 |
| Iron car axles | 20.50 to 21.00 |
| Steel car axles | 16.00 to 16.25 |
| Locomotive axles | 22.00 to 22.50 |
| No. 1 busheling scrap | 11.00 to 11.25 |
| No. 2 busheling scrap | 7.00 to 7.25 |
| Old car wheels | 12.00 to 12.25 |
| Cast iron borings | 9.65 |
| Machine shop turnings | 9.75 |
| Sheet bar crop ends | 13.75 to 14.00 |
| Old iron rails | 14.50 to 14.75 |
| No. 1 wrought scrap | 12.00 to 12.25 |
| Heavy steel axle turnings | 9.75 to 10.00 |
| Stove plate | 9.00 to 9.25 |

* These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

† Shipping point.

Coke.—Inquiries are in the market for round lots of furnace coke from two blast furnace interests, one for delivery in second quarter and the other for second and third quarters. Standard grades of furnace coke on contracts are held at about \$1.75 to \$1.80, net ton, at oven. The output of coke in the Upper and Lower Connellsville regions last week was 360,153 tons, a decrease from the previous week of 40,444 tons. We quote standard furnace coke for spot shipment at \$1.80 to \$1.85, and 72-hour foundry coke for prompt shipment at \$2 to \$2.10, per net ton, at oven. The new demand for foundry coke is reported quite active and foundries are taking in coke on their contracts very promptly.

Chicago

CHICAGO, ILL., February 13, 1912.

Succeeding the more than normal volume of business which increased steadily in volume through November, December and January, the rate of buying in February has failed to hold its own. In a degree this recession has been attributed to the severity of weather conditions and in part it is looked upon as the natural ebb of business following the high tide of orders. An early resumption of buying interest to provide for second quarter requirements is expected. The better prices which have since prevailed are not being closely maintained, although the situation with those mills by which the majority of business was taken remains very comfortable and they are, therefore, least aggressive in seeking business requiring a sacrifice of prices. In this market selling by Eastern mills is tending to increase, being brought about by their willingness to shade local quotations. For Western delivery a Pittsburgh basis of 1.10c. on bars, structural shapes and plates apparently applies. Local producers are meeting competition rather than establishing the market.

Pig Iron.—The sales of the past week have been routine rather than important. Inquiry has been almost entirely confined to small lots for prompt delivery. The only noteworthy transaction is the reported pur-

chase by a local foundry of a small tonnage for last half delivery. In the South the price of \$10.50 for No. 2 is being adhered to, but at delivery points where the pressure of competition from Northern iron is most severe either little iron is being moved or some concessions from this price are necessary. The Southern situation in general gives evidence of much greater strength than that of local furnaces. Some of the local furnaces are understood to be quoting in a much more widespread territory than is usual and the delivered prices being made at these points are sometimes equivalent to very low figures at the furnace. The regular quotation for local irons continues to be \$14, f.o.b. furnace. We quote for Chicago delivery, except for local irons, which are f.o.b. furnace, the following prices on prompt shipments:

| | |
|---|--------------------|
| Lake Superior charcoal..... | \$16.00 to \$16.50 |
| Northern coke foundry, No. 1..... | 14.50 |
| Northern coke, foundry, No. 2..... | 14.00 |
| Northern coke foundry, No. 3..... | 13.50 to 14.00 |
| Northern Scotch, No. 1..... | 16.00 |
| Southern coke, No. 1 foundry and No. 1 soft..... | 15.35 |
| Southern coke, No. 2 foundry and No. 2 soft..... | 14.85 |
| Southern coke, No. 3..... | 14.35 |
| Southern coke, No. 4..... | 14.10 |
| Southern gray forge..... | 13.85 |
| Southern mottled..... | 13.85 |
| Malleable Bessemer..... | 14.00 |
| Standard Bessemer..... | 16.75 |
| Basic..... | 14.75 |
| Jackson County and Kentucky silvery, 6 per cent..... | 16.40 |
| Jackson County and Kentucky silvery, 8 per cent..... | 17.40 |
| Jackson County and Kentucky silvery, 10 per cent..... | 18.40 |

Rails and Track Supplies.—The consideration of rail specifications continues to be the ostensible reason for retarding the placing of rail orders. In fact the delay in this particular continues to reflect the general buying attitude of the railroad. Car orders reported during the week were unimportant as to size and included 300 box cars and 200 underframes for the Southern Railroad placed with the Mount Vernon Car & Mfg. Company and 300 refrigerator cars to be rebuilt for the Erie Railroad by the Whipple Car Company. The Rock Island is understood to have still unplaced some 700 all-steel cars. The demand for light rails is very scattering and prices are entirely lacking in firmness and regularity. Specifications for track fastenings are somewhat less plentiful. We quote standard railroad spikes at 1.50c., base; track bolts, with square nuts, 1.90c., base, all in carload lots, Chicago; standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c.; angle bars, 1.50c., Chicago.

Plates.—Market developments and changes in connection with plates are associated rather with that smaller portion of the total business for which the less important mills are competing. The leading interest and its principal competitor continue to receive fairly liberal specifications and find their order books sufficiently well filled to warrant their being less aggressive at this time. As compared with local quotations, which have ranged from 1.30c. to 1.40c., Chicago, the determining price is now on the basis of 1.10c., Pittsburgh. This slight concession by the mills has shown some tendency to delay buyers' specifications. We quote for Chicago delivery, mill shipment, 1.28c. to 1.33c., and from store, 1.60c.

Structural Material.—There is little doubt that building operations have been materially hampered by weather conditions and that structural tonnage has suffered accordingly. Contracts reported during the last week aggregated over 11,000 tons and included 5000 tons for the Santa Fé Railroad, placed with the American Bridge Company; 2350 tons for the Spokane, Portland & Seattle Railway Company, awarded to the Pennsylvania Steel Company; 1554 tons for the blast furnace stock bins of the Minnesota Steel Company, to be fabricated by the American Bridge Company; 604 tons for the Franklin Company building, Chicago, to the Hansell-Elcock Company; 992 tons for the Garland building, Los Angeles, Cal., to Milliken Bros.; 556 tons for the Chicago Business College, to the Modern Steel Structural Company, Waukesha, Wis.; 240 tons for the Twin City Rapid Transit Company, Minneapolis, to the American Bridge Company; 130 tons for a steel head frame for the Bristol Mining Company, Crystal Falls, Mich., to the Wisconsin Bridge & Iron Company. We quote for Chicago delivery, mill shipment, 1.28c. to 1.33c., and from store, 1.60c.

Sheets.—The unfavorable market conditions from the standpoint of sheet makers have had a concentrated effect upon the price of galvanized sheets in particular. Competitive conditions and the high price of spelter

this territory has assumed a decidedly firmer attitude. The general tonnage holds up very satisfactorily, and have combined to eliminate much of the profit in this product. As a result the largest independent maker in those mills most favorably situated as to raw materials find themselves sufficiently well supplied with orders to warrant better price conditions than prevail. We quote Chicago prices as follows: Carload lots, from mill, No. 28 black sheets, 2.03c. to 2.08c.; No. 28 galvanized, 3.03c. to 3.08c.; No. 10 blue annealed, 1.53c. to 1.58c. Prices from store, Chicago, are: No. 10, 1.90c.; No. 12, 1.95c.; No. 28 black, 2.30c.; No. 28 galvanized, 3.35c.

Bars.—Local mills continue to control the Western market in the matter of supplying steel bar tonnage, and business is for the most part on a one-price basis. Bar iron tonnage is heavier than it has been in many months, and both the Interstate Iron & Steel Company and the Republic Iron & Steel Company mills at East Chicago, particularly the former, are operating well up to capacity. While desirable bar iron business cannot be obtained at prices higher than 1.15c., Chicago, this quotation is also a practical minimum. For the less desirable orders an advance of 50c. a ton is not uncommon. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.25c. to 1.33c.; bar iron, 1.15c. to 1.20c.; hard steel bars, rolled from old rails, 1.15c. to 1.20c. From store: Soft steel bars, 1.50c. to 1.55c., Chicago.

Wire Products.—The opening up of Southern spring trade has been an encouraging influence in the movement of barb wire and fencing, while prospective spring building operations have had a noticeable effect in increasing the demand for wire nails. Indications point to a heavy demand for manufactured fence, and makers of this material have been specifying freely against fence wire contracts. We continue to quote as follows: Plain wire, No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78 to \$1.83; galvanized, \$2.08; polished staples, \$1.83; galvanized, \$2.13, all Chicago.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company was successful bidder on 25,000 tons of pipe for the city of Chicago. The city of St. Louis has advertised a letting of pipe carrying a preliminary tonnage of about 3000 tons for February. A number of smaller contracts for municipal service are also reported. We quote as follows, per net ton, Chicago: Water pipe, 4-in., \$27; 6 to 12-in., \$25; 16-in. and up, \$24.50, with \$1 extra for gas pipe.

Old Material.—The larger number of transactions under current market conditions in connection with scrap have been under pressure from the selling interest. Buyers have taken in a fair tonnage of material, but very generally at their own prices. The immediate outlook for those who are long on scrap is not reassuring, and melters are disposed to confine their purchases to their weekly requirements. The Chicago & Alton Railroad is offering 500 tons, for which it will accept quotations February 16. The Santa Fé also offers from time to time its accumulations of borings and heavier uncut scrap. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

| Per Gross Ton. | |
|--|--------------------|
| Old iron rails..... | \$15.00 to \$15.50 |
| Old steel rails, rerolling..... | 12.50 to 13.00 |
| Old steel rails, less than 3 ft..... | 11.75 to 12.25 |
| Relaying rails, standard section, subject to inspection..... | 24.00 |
| Old car wheels..... | 13.00 to 13.50 |
| Heavy melting steel scrap..... | 10.50 to 11.00 |
| Frogs, switches and guards, cut apart..... | 10.50 to 11.00 |
| Shoveling steel..... | 10.00 to 10.50 |
| Steel axle turnings..... | 8.50 to 9.00 |
| Per Net Ton. | |
| Iron angles and splice bars..... | \$12.50 to \$13.00 |
| Iron arch bars and transoms..... | 13.50 to 14.00 |
| Steel angle bars..... | 10.00 to 10.50 |
| Iron car axles..... | 17.75 to 18.25 |
| Steel car axles..... | 15.50 to 16.00 |
| No. 1 railroad wrought..... | 11.00 to 11.50 |
| No. 2 railroad wrought..... | 10.00 to 10.50 |
| Steel knuckles and couplers..... | 10.00 to 10.50 |
| Steel springs..... | 10.50 to 11.00 |
| Locomotive tires, smooth..... | 12.75 to 13.25 |
| Machine shop turnings..... | 6.50 to 7.00 |
| Cast and mixed borings..... | 6.25 to 6.50 |
| No. 1 busheling..... | 8.75 to 9.25 |
| No. 2 busheling..... | 6.25 to 6.75 |
| No. 1 boilers, cut to sheets and rings..... | 7.00 to 7.50 |
| Boiler punchings..... | 12.50 to 13.00 |
| No. 1 cast scrap..... | 11.00 to 11.50 |
| Stove plate and light cast scrap..... | 9.25 to 9.75 |
| Railroad malleable..... | 10.25 to 10.75 |
| Agricultural malleable..... | 9.00 to 9.50 |
| Pipes and flues..... | 8.00 to 8.50 |

Philadelphia

PHILADELPHIA, PA., February 13, 1912.

The general tendency of buyers appears to be to await developments and in the meantime to cover current needs by small purchases for early shipment. The pig iron markets have been very dull, even low-grade iron transactions being quieter. Orders for finished materials come out irregularly, although there have been some good specifications in some lines. The large inquiries for plates and shapes for shipbuilding work are still unclosed. Considerable local business for fabricated structural work which has been pending here has, it is understood, gone to the leading interest. A moderate volume of business is moving in iron and steel bars. The old material market is firmer, but little business is passing.

Iron Ore.—Several cargo lots of both high and low phosphorous Spanish ore for prompt shipment have been taken by a Schuylkill Valley consumer. Importations during the week include 5918 tons of Swedish and 11,700 tons of Cuban ore.

Pig Iron.—The most interesting feature of the iron market is the fact that consumers are taking deliveries freely and that furnace shipments are, in many cases, exceeding the current make, particularly in foundry grades. New business, however, comes out rather slowly, and there is almost an entire absence of any inquiry covering any large quantities. Current business is confined to small lots, which are moving at prices ranging from \$14.85 to \$15.25, delivered, for No. 2 X foundry. Several furnaces continue to maintain quotations at the high range, but receive only scattered orders from regular customers, and report has it that the inside figure has been slightly shaded by some producers who require business to fill out their order books. One Virginia producer reports a sale of 1000 tons of No. 2 X at \$12.50, at furnace, for Western shipment. The cast iron pipe makers in this district are still negotiating for blocks of low-grade iron; some small lot business has been done, but buyers and sellers are still apart as to prices for round lots, for delivery over the first half. Northern low-grade iron has been rather scarce and sellers are maintaining a firmer attitude. One contract for 1000 tons, against an inquiry of several weeks ago, was closed by a Lehigh Valley seller. Some moderate business is still pending in rolling mill forge iron, but no large sales are reported. With the exception of an inquiry for several thousand tons of basic iron from the receiver of a central Pennsylvania steel plant, the market for steel-making grades is dull. Very little demand for low phosphorus iron is noted. The Eastern Pig Iron Association, which met last week, had an uneventful meeting; orders received and stocks on furnace yards showed but little variation from last month. The same statement is made regarding statistics in connection with the Virginia Pig Iron Association. It is not unlikely that some further curtailment in production by eastern Pennsylvania producers will be made in the near future. There has been no change in general quotations, current business moving at the following range, delivered in buyers' yards in this district:

| | |
|--------------------------------------|--------------------|
| Eastern Pennsylvania No. 2 X foundry | \$14.85 to \$15.25 |
| Eastern Pennsylvania No. 2 plain | 14.60 to 15.00 |
| Virginia foundry | 15.00 to 15.50 |
| Gray forge | 14.25 |
| Basic | 14.25 |
| Standard low phosphorus | 19.00 to 19.50 |

Ferroalloys.—No new business from consumers in this district is reported, but sales of small lots of 80 per cent. ferromanganese have been made for Western delivery at \$41, Baltimore. Fifty per cent. ferrosilicon is quoted at \$70, delivered here, but no new business has come out. Very little inquiry for furnace ferrosilicon is noted.

Billets.—The demand is rather scattered and confined mostly to small lots for early delivery. Inquiries for several 100-ton lots of forging billets are noted. Current sales are of the hand to mouth character, although specifications come out more freely. Prices are unchanged, basic open-hearth rolling billets being quoted at \$22.40 to \$23 and forging billets \$26.40 to \$27.40, delivered in this vicinity.

Plates.—While a fair run of miscellaneous business comes out, specifications on boat, bridge and tank plates have been heavier and mills have made slight gains. The recent heavy inquiries for ship plates are still open. Inquiries for several thousand tons of tank plates are anticipated and the outlook for a better run of miscellaneous business is considered more favorable. Prices are being maintained at the 1.30c., delivered, basis for ordinary plates by the leading Eastern producers.

Structural Material.—Several of the larger propositions in this district, which have been dragging along for some time, have developed into contracts. The Bellevue-Stratford addition, the Stock Exchange and the Stetson Building have, it is understood, gone to the leading interest. The Lehigh Navigation power house, about 2000 tons, will be fabricated by a local concern. The general contract for the Manufacturers' Club building will, it is stated, be awarded to Irwin & Leighton, who are the low bidders. Plans out for the Hotel Vendig call for from 600 to 800 tons. Few developments are reported in bridge work. The demand for plain shapes is rather light, but for ordinary business 1.30c., delivered here, is quoted. Fabricated prices are still reported extremely low.

Sheets.—A good volume of small orders continues to come out and mills in this district are fairly well fixed for some weeks ahead. The bulk of the business is for early delivery, although some few contracts have been entered. Western No. 28 sheets are quoted at 2.05c., delivered here, although Eastern mills making smooth, loose-rolled sheets easily obtain ¼c. to ½c. per lb. advance.

Bars.—A moderate volume of business is moving in both iron and steel bars. Mills are not urging business, being supplied with work for single turn operations for some little time. The usual current business in the better grades of iron bars is being done at about 1.27½c., delivered in this district, with some of the smaller producers slightly shading that quotation. Steel bars are held at 1.30c., delivered, by the producers, although some resale bars, contracts for which were placed several months ago at low figures, are reported offered at a slight concession.

Coke.—An increased demand for fuel coke is noted, sales in small and moderate lots being reported at \$1.60 to \$1.70 at oven. Some fair sales of foundry coke are reported at \$2.25 at oven, although some producers have advanced prices. Little movement in furnace coke is noted; prices are comparatively firm at \$1.80 to \$1.90 at oven. The following range of prices, per net ton, about represents the market for deliveries in this vicinity:

| | |
|----------------------------|------------------|
| Connellsville furnace coke | \$3.95 to \$4.05 |
| Foundry coke | 4.20 to 4.50 |
| Mountain furnace coke | 3.70 to 3.80 |
| Foundry coke | 4.00 to 4.40 |

Old Material.—The market is quiet, although prices appear firmer. No large sales are reported, transactions being usually in small lots. A sale of upward of 1000 tons of wrought turnings is noted at a price close to the market. Sales of heavy melting steel have been small; this grade on recent railroad lists was sold at prices ranging upward from \$12.15, delivered on company lines. The general tendency of both buyers and sellers appears to be to await developments. The following range of prices about represents quotations at which ordinary current business for prompt shipment can be done for delivery in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate from Philadelphia varying from 35c. to \$1.35 per gross ton, for shipment ranging from prompt to the remainder of the year:

| | |
|--|--------------------|
| No. 1 heavy melting steel scrap | \$11.75 to \$12.25 |
| Old steel rails, rerolling (nominal) | 14.00 to 14.50 |
| Low phosphorus heavy melting steel scrap | 15.50 to 16.00 |
| Old steel axles | 17.00 to 17.50 |
| Old iron axles (nominal) | 22.00 to 23.00 |
| Old iron rails | 16.00 to 17.00 |
| Old car wheels | 12.00 to 12.50 |
| No. 1 railroad wrought | 14.00 to 14.50 |
| Wrought iron pipe | 11.50 to 12.00 |
| No. 1 forge fire | 9.75 to 10.25 |
| No. 2 light iron (nominal) | 6.75 to 7.25 |
| Wrought turnings | 9.00 to 9.50 |
| Cast borings | 8.00 to 8.50 |
| Machinery cast | 13.00 to 13.50 |
| Railroad malleable (nominal) | 11.75 to 12.25 |
| Grate bars, railroad | 10.00 to 10.50 |
| Stove plate | 9.50 to 10.00 |

The New York and New Jersey branch of the National Metal Trades Association held its annual meeting and dinner at the Engineers' Club, New York, on the evening of February 3. Substantially all of the members were present and the following officers were elected: President, Michael Fogarty; vice-president, H. N. Covell; treasurer, M. K. Bowman; members of the executive committee, to serve four years, Stevenson Taylor and W. A. Dreuett. The executive committee met February 7 and re-elected as the advisory committee H. N. Covell, chairman; Stevenson Taylor and M. K. Bowman.

Cleveland

CLEVELAND, OHIO, February 12, 1912.

Iron Ore.—While there are no new developments in the price situation it is the general understanding that consumers will be given advantage of the 20 cent reduction in freight rates from Mesaba and Vermillion range points to upper lake ports, and it appears probable that the present differential will be maintained by a corresponding reduction in prices on old range ore. This would amount to a general reduction of 20 cents on all prices, although in the case of Mesaba and Vermillion ores, were no other changes made, the net returns to the sellers would not show reduction. However, it is not likely that the reduction will be limited to 20 cents a ton. In view of the general situation sellers do not look for a buying movement before April, and the settlement of the price situation may be delayed until that time. Only one inquiry developed during the week and that was for a very small tonnage. No business has come from inquiries from the east and it is not likely that there will in the near future. The Bethlehem Steel Company, which has been feeling the market on prices on 100,000 tons of non-Bessemer ore, did not buy lake ore last year, after making a similar inquiry, prices and quotations not being satisfactory. This company, however, is consuming some lake ore on a previous long-time contract. Shipments of ore from Lake Erie docks for January were 284,509 tons as compared with 772,563 tons in December. The heavy falling off is attributed mostly to the severe weather conditions. The ore on docks February 1 was 8,375,800 tons. We quote prices as follows: Old Range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—The market is generally quiet. There is no new inquiry for steel making iron and none of any size for foundry grades. The United Steel Company, Canton, which had an inquiry out last week for 2000 tons of basic for March delivery, has bought this amount from a Cleveland interest with a nearby furnace, having a freight rate of 50 cents. The 1000 tons of No. 2 foundry wanted for the second quarter delivery for the Springfield, Ohio, plant of a radiator interest is understood to have gone to a Cleveland furnace at \$12.75 at furnace. A few sales of foundry iron in lots of 100 tons and under are reported. Consumers are generally well covered for the first half and orders that are coming out are mostly for early needs. Foundrymen are taking it for granted that ore prices will be reduced and that pig iron may possibly be cheaper. Under the circumstances little business in pig iron excepting small current orders is expected during the next few weeks. The stack of the Perry Iron Company, Erie, Pa., has been blown out for relining. Owing to frozen ore B furnace of the Detroit Iron & Steel Company has been banked and may be blown out. We quote the following prices for prompt shipment and the first half, delivered Cleveland:

| | |
|--|----------------|
| Bessemer | \$14.90 |
| Basic | 13.25 |
| Northern foundry No. 2..... | 13.25 to 13.50 |
| Southern foundry No. 2..... | 14.35 to 14.85 |
| Gray forge | 12.50 |
| Jackson County silvery, 8 per cent. silicon..... | 17.05 |

Coke.—There is a moderate demand for small lots of foundry coke. Shipping orders on contract are good and consumers are complaining of delays in delivery. There is a scarcity of stock coke and some second quality of furnace coke is being sold at \$1.75 a ton to take the place of stock coke. We quote standard Connellsville furnace coke at \$1.80 to \$1.90 per net ton, at oven. Foundry grades are firm at \$2.10 to \$2.25 for prompt shipment and \$2.25 to \$2.40 for contract.

Finished Iron and Steel.—There is little activity in the market. Mills are getting moderate specifications but the volume of new business is quite limited. Prices generally are easier because of the continued absence of a demand in any volume. While the quotation is not general, steel bars have sold in this market at 1.10c., Pittsburgh, in car lots where the specifications were desirable. Plates are weaker, being freely offered at 1.10c., Pittsburgh. Mills that have been getting 1.20c. for small lots appear more disposed to take such orders at 1.15c. Structural material is firmer than plates, being held at 1.20c. for small lots and 1.15c. for desirable orders. The demand for structural material for building work is very light. Little new work is coming out and local fabricators are holding back somewhat on specifications. This is due largely to the severe weather which has put a stop to outside construction work. The

Carnegie Steel Company has taken an order for the Northern Ohio Traction & Light Company for 1000 tons of standard section rails for double tracking a portion of its line. The demand for heavy sheets is fair, but there is little call at present for light sheets. Sheet prices are fairly firm, although concessions of \$1 a ton are reported on desirable orders. The demand for iron bars is unsatisfactory, orders being sufficient to keep the local mills running about half the time. We quote iron bars at 1.20c., Cleveland mill.

Old Material.—There is practically no demand for any grade of scrap. Little is being offered by dealers, shipments being light because of severe weather. Local steel mills are supplied for their immediate needs, but are expected to be in the market shortly for a limited amount. The market is generally weak but quotations are unchanged. Dealers are not eager to sell. The Norfolk & Western Railroad has a list out which will close February 16. Dealers' prices f.o.b. Cleveland are as follows:

| Per Gross Ton. | |
|--------------------------------------|--------------------|
| Old steel rails, rerolling..... | \$12.25 to \$12.75 |
| Old iron rails | 14.00 to 14.50 |
| Steel car axles | 17.50 to 18.00 |
| Heavy melting steel | 11.00 to 11.50 |
| Old car wheels | 12.00 to 12.50 |
| Relaying rails, 50 lb. and over..... | 22.50 to 23.50 |
| Agricultural malleable | 10.50 to 11.00 |
| Railroad malleable | 11.50 to 12.00 |
| Light bundled sheet scrap..... | 9.50 to 10.00 |

| Per Net Ton. | |
|--|--------------------|
| Iron car axles | \$18.50 to \$19.00 |
| Cast borings | 6.25 to 6.50 |
| Iron and steel turnings and drillings..... | 6.75 to 7.00 |
| Steel axle turnings | 7.25 to 7.75 |
| No. 1 busheling | 9.50 to 10.00 |
| No. 1 railroad wrought | 11.00 to 11.25 |
| No. 1 cast | 11.25 to 11.75 |
| Stove plate | 9.00 to 9.25 |
| Bundled tin scrap | 11.00 to 11.50 |

Cincinnati

CINCINNATI, OHIO, February 13, 1912.

Pig Iron.—A number of consumers have been feeling the market for third and fourth quarter requirements, but no definite quotations have been given out to the general trade. However, it is rumored that a few Southern producers have made confidential prices on contract business to extend through the third quarter at a slight advance over present quotable figures. The high prices on coke have caused Northern furnace interests to hold back until another buying movement commences. There is still some Southern No. 2 foundry iron available at \$10, Birmingham, and in a few instances this price has been made on contracts with the shipment date extended until July 1, notable among which is a sale to a northern Ohio melter covering over 700 tons. A southern Ohio concern also took 300 tons of No. 2 foundry at \$10, Birmingham, for delivery during the remainder of the first half. On the other hand a bona fide sale of 1000 tons of Southern No. 2 soft was made to a north central Ohio company at \$10.50, shipments to be completed as quickly as possible, but before July 1; however, special conditions surrounded this particular sale. The carload business in Southern foundry is only moderately good, but considerable of it is said to have been booked at \$10.25 at furnace. Northern No. 2 foundry remains at \$13, Ironton, and at this figure and for first half shipment a southern Ohio melter purchased 500 tons; a few smaller sales are reported, but the market is very dull. Southern charcoal iron is in better demand and several medium sized sales have been made lately at \$22, Birmingham. The lower grades of Southern iron are scarce and sellers apparently have no trouble in securing \$9.50 at furnace for No. 4 foundry and gray forge. Malleable is not in demand and is quoted at \$13, Ironton. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows for prompt shipment:

| | |
|--|--------------------|
| Southern coke, No. 1 foundry and 1 soft..... | \$13.75 to \$14.25 |
| Southern coke, No. 2 foundry and 2 soft..... | 13.25 to 13.75 |
| Southern coke, No. 3 foundry..... | 12.75 to 13.25 |
| Southern coke, No. 4 foundry..... | 12.50 to 13.00 |
| Southern gray forge | 12.50 to 13.00 |
| Ohio silvery, 8 per cent. silicon..... | 16.45 to 16.95 |
| Lake Superior coke, No. 1..... | 14.70 to 14.95 |
| Lake Superior coke, No. 2..... | 14.20 to 14.45 |
| Lake Superior coke, No. 3..... | 13.70 to 13.95 |
| Basic, Northern | 14.20 to 14.45 |
| Standard Southern car wheel..... | 25.25 to 25.50 |
| Lake Superior car wheel..... | 19.00 |

Coke.—It is reported from the Connellsville district that 48-hr. coke is an exceedingly scarce article there, and prices are much higher. This is partly attributable to a scarcity of labor as well as to the increased demand from furnaces. Standard Connellsville furnace brands

are quoted around \$1.90 to \$2 at oven for either prompt or future shipment. Stock coke in all three districts is bringing all the way from \$1.55 to \$1.70 per net ton at oven. In the Pocahontas district 48-hr. coke is selling around \$1.65 to \$1.75, but Wise County prices are about 10c. to 15c. a ton higher. Foundry coke averages about the same in the three districts, being quotable at \$2 to \$2.35 at oven, although Connellsville foundry grades are hard to obtain below \$2.25 for even prompt shipment. An inquiry for 10,000 tons of furnace coke, to be shipped this year, is being figured on by a local agency.

Finished Material.—New business is very slow coming in, but specifications on contracts make an excellent showing. Local mill agencies are somewhat disappointed over the apathetic attitude generally assumed by customers, but it is not thought that reports from other sections as to a softening in prices have had any effect on the demand. The mill price on steel bars here is firm at 1.15c., Pittsburgh, and 1.20c. on structural material. The local warehouse quotations are unchanged at 1.60c. and 1.70c. respectively.

Old Material.—No scrap of any kind is being bought except to fill nearby requirements. Prices are weak, and while there has been no change in figures previously quoted, it is quite probable that if a customer came into the market for an attractive tonnage he could obtain concessions. The minimum figures given below represent what buyers are willing to pay for delivery in their yards in southern Ohio and Cincinnati and the maximum quotations the selling prices f.o.b. at yards:

| Per Gross Ton. | |
|------------------------------------|------------------|
| Bundled sheet scrap..... | \$7.00 to \$7.50 |
| Old iron rails..... | 12.50 to 13.00 |
| Relaying rails, 50 lb. and up..... | 20.00 to 21.00 |
| Revolving steel rails..... | 11.00 to 11.50 |
| Melting steel rails..... | 9.00 to 9.50 |
| Heavy melting steel scrap..... | 9.00 to 9.50 |
| Old car wheels..... | 11.00 to 11.50 |

| Per Net Ton. | |
|---------------------------------------|-------------------|
| No. 1 railroad wrought..... | \$9.75 to \$10.25 |
| Cast borings..... | 5.25 to 5.75 |
| Steel turnings..... | 5.50 to 6.00 |
| No. 1 cast scrap..... | 10.00 to 10.50 |
| Burnt scrap..... | 6.50 to 7.00 |
| Old iron axles..... | 16.00 to 16.50 |
| Locomotive tires (smooth inside)..... | 11.50 to 12.00 |
| Pipe and flues..... | 7.00 to 7.50 |
| Malleable scrap..... | 7.50 to 8.00 |

Birmingham

BIRMINGHAM, ALA., February 12, 1912.

Pig Iron.—From quotations now made, and in the absence of sales at lower figures, it seems that a higher selling price than a basis of \$10, Birmingham, for No. 2 foundry has been established. To what extent the buying has been checked by the advance it is difficult to estimate, but there is some tonnage pending by reason of the refusal of certain interests to accept a lower price than \$10.50 for shipments in the first half. The most significant inquiry pending is a lot of 5000 tons of Nos. 2, 3 and 4 foundry, mentioned in last report. The sales made in the week consisted of several lots of 500 to 750 tons each, for delivery in the first half, and 1000 tons of special analysis iron for shipment extending through the third quarter. For the regular fracture grades sold a basis of \$10.25 to \$10.50 was received for No. 2 foundry with a differential of 50c. per ton for No. 3. An aggregate of 1800 tons of low silicon, high manganese iron, for shipment extending through April, was sold at \$11 at furnace, and 1000 tons of high silicon, high manganese iron, for third quarter shipment, brought \$11.50 and \$12.50, the price being governed by the silicon content. Offers of \$10 for spot deliveries were refused, but, aside from the round tonnage mentioned above, the individual offerings were generally small. The most important development in the market recently has been the withdrawal of a leading interest by reason of comparison of order-book requirements with the probable make during the remainder of the first half. This action alone has had a very decided tendency to strengthen the situation, while the advance to a basis of \$10.25 by a small concern that quotes only for spot shipment is not without its effect. Stock returns for February 1 show a reduction of 17,000 tons to have been made in this State in January. The largest decrease is shown in warrant holdings, but both free foundry and basic accumulations were smaller. The rate of shipment from furnace yards continues very satisfactory comparatively, and no preparations are being made for changes in furnace operations other than have been mentioned. We now consider the market for first half deliveries correctly represented by the prices named

below, f.o.b. Birmingham, without an established quotation for deliveries further advanced:

| | |
|-----------------------------------|--------------------|
| No. 1 foundry and No. 1 soft..... | \$10.75 to \$11.00 |
| No. 2 foundry and No. 2 soft..... | 10.25 to 10.50 |
| No. 3 foundry..... | 9.75 to 10.00 |
| No. 4 foundry..... | 9.50 to 9.75 |
| Gray forge..... | 9.25 to 9.50 |
| Standard basic..... | 10.25 to 10.50 |
| Off basic..... | 9.75 to 10.00 |

Cast Iron Pipe.—The water pipe requirement at Atlanta, Ga., will be furnished by the General Pipe & Foundry Company of that city and the United States Cast Iron Pipe & Foundry Company. The American Cast Iron Pipe Company will furnish an aggregate of 1100 to 1500 tons of gas pipe for the city of Albany, Ga., and 1000 tons of water pipe for Los Angeles, Cal. An addition of 1500 tons has been made to the water pipe requirement for Spokane, Wash., which will be furnished from Alabama plants. Improvements at Lexington, Tenn., to require some 1500 tons of water pipe have been contracted for, and it will no doubt come up for letting soon. We continue to quote as follows, per net ton, f.o.b. cars here, for water pipe: 4 to 6-in., \$23; 8 to 12-in., \$22; over 12-in., average \$21, with \$1 per ton extra for gas pipe. These prices are probably subject to shading for municipal contracts, but are firm for the small orders placed.

Old Material.—This has been largely a dealers' market, with but little going to consumers. A round tonnage of old car wheels was in demand, but the accumulation of such material in this district was not sufficient to be of interest to the buyer. Local mills are buying small quantities of wrought and steel scrap from time to time as needed, and the demand for low-grade pig iron is being met to a certain extent with machinery cast, light cast and stove plate. We continue to quote asking prices as follows, per gross ton, f.o.b. cars here:

| | |
|---------------------------------|--------------------|
| Old iron axles (light)..... | \$12.50 to \$13.00 |
| Old steel axles (light)..... | 11.50 to 12.00 |
| Old iron rails..... | 11.50 to 12.00 |
| No. 1 railroad wrought..... | 10.50 to 11.00 |
| No. 2 railroad wrought..... | 9.00 to 9.50 |
| No. 4 country wrought..... | 6.00 to 6.50 |
| No. 2 country wrought..... | 5.50 to 6.00 |
| No. 1 machinery..... | 8.50 to 9.00 |
| No. 1 steel..... | 8.00 to 8.50 |
| Tram car wheels..... | 7.50 to 8.00 |
| Standard car wheels..... | 9.50 to 10.00 |
| Light cast and stove plate..... | 6.00 to 6.50 |

It is now understood that the formal taking over of the Birmingham Coal & Iron Company properties by the Woodward Iron Company has been postponed until April 1.

The Bonnyman-Norman Coal & Iron Company of this city has established a branch office in Atlanta, Ga., in charge of J. L. Edwards. The company expects to establish offices in New Orleans, La., and Memphis, Tenn.

The American Cast Iron Pipe Company of this city will establish sales offices at Portland, Ore., and San Francisco, Cal., both of which will be under the direction of J. W. Blair, secretary.

San Francisco

SAN FRANCISCO, CAL., February 6, 1912.

The January movement, on the whole, was satisfactory, and sales in most departments are keeping up at about the same rate, though there is less new inquiry coming out than might be desired. In some lines, owing to unsettled conditions in the jobbing trade, the demand is lighter than last month. Purchases for stock, though larger than in December, are about as small as actual requirements permit, and any increase will be based upon the immediate consuming demand. Retailers and large consumers, as well as jobbers, are limiting their surplus supplies very closely, the January revival being due to the fact that stocks were practically cleaned up.

Bars.—The bar market is rather demoralized. Eastern reinforcing steel finds more competition than formerly from the local product, and with a limited consuming demand prices are maintained with difficulty. The demand for ordinary building purposes is fair, but large construction projects come out very slowly, and business arising from the Exposition construction may be delayed until late in the year. An apparent lack of harmony among distributing interests tends to keep the soft steel market unsettled, and the recent cut in prices has been followed by an abrupt curtailment of demand in the small trade. The outlook for prices is very uncertain, depending largely upon the attitude of

Eastern interests, and for the present buying is entirely of a hand-to-mouth nature. Values remain about as last quoted, reinforcing bars standing at 1.90c. for open-hearth and 1.85c. for rerolled, while merchant bars from store are quoted at 1.85c. for steel and 1.75c. for iron.

Structural Material.—The building situation locally is rather encouraging, the January total of building permits being \$1,870,617, the best record since last August. The year has also started well in southern California, though business is quiet in the north. The steel tonnage, however, is not especially heavy, only a few small contracts having been closed, and while many important plans are under way, little new work is ready for figuring. The Hale department store, and probably several other important buildings in prospect, will be of reinforced concrete. The general contract has been let on the Garland Theater at Los Angeles, but the award on the steel has been delayed, and no inquiry is expected for some time on the Huntington building in that city. The Golden Gate Structural & Ornamental Iron Works, this city, will fabricate about 100 tons for a warehouse for Foucar, Ray & Simon, local steel merchants. A number of local jobs on which figures have been submitted will be let in a few days. The Industrial Arts building, to be erected for the State at Berkeley, Cal., requiring about 600 tons, will be in the market shortly, and an inquiry is also expected on the Crane Company's building in Oakland. Plans for the Elks' building, Seattle, Wash., will be out in about a month. Plans for the Sheehy estate apartments, this city, are being revised. Preparations are under way for the construction of a new city hall for this city, which will be one of the largest buildings on the coast, but it is doubtful whether any contracts on the job will be let this year.

Rails.—Current business consists mostly of small orders, though a few fairly large inquiries have come out, on which orders may be booked at any time. Some of the largest prospective buyers will probably remain out of the market for a month or two, but the present movement is very fair in the aggregate. Some inquiries for both light and standard sections are beginning to come from logging firms, and the demand from this quarter should continue for some time. Aside from the business of the transcontinental roads, the coast tonnage is expected to be somewhat larger this spring than last. There is a fair demand for relaying rails, offerings of which are quite liberal.

Sheets.—Buying continues fully as active as for several weeks, with a strong demand for immediate consumption. Galvanized sheets are the strongest item locally, the movement being rather better than usual for this season, while in southern California new contracts for riveted pipe are bringing out a good inquiry from manufacturers. Neither manufacturers nor merchants are taking on any large tonnage beyond immediate needs, but there is every indication of a continued steady demand.

Plates.—With little inquiry from the small trade, merchants are buying practically nothing. The Los Angeles Gas & Electric Company has placed a contract in the East for a 1,000,000 cu. ft. gas holder, and a project is under way for the erection of a large gas plant at Pittsburg, Cal., but the general tank business is dull.

Merchant Pipe.—Stocks in all hands have seldom been as light as for the last month, and some inconvenience is said to have resulted. Quick delivery has accordingly been desired on most orders recently placed. Plumbers and other consumers are not accumulating much surplus, but their current needs are fairly large. Merchants also are buying only from day to day, but the aggregate tonnage is fully up to expectations. Oil operators are buying very little, and there is too much oil in storage to give much opportunity for new development.

Cast Iron Pipe.—The January tonnage was the lightest in several months, though several fair orders were booked in southern California about the end of the month, and there is plenty of business in sight for the spring. The city of Spokane, Wash., has placed an order for about 1500 tons with the Crane Company. The San Diego Consolidated Gas & Electric Company has ordered eight carloads, and the Pacific Gas & Electric will soon be in the market for an extension of its system at Fresno, Cal. Santa Barbara, Cal., is out for a small tonnage, and the San José Water Company will place an order for May delivery. The Yosemite Valley Lumber Company is planning a fire protection system at Merced, Cal., for which cast iron may be used.

Pig Iron.—Some of the local foundries are now well occupied, and while the total requirements show little increase some general improvement is expected in the spring. So far, however, there is no heavy movement of pig iron, purchases being limited to requirements of the near future. Offerings of foreign iron are rather light, and occasional small sales of Southern iron are noted. Prices are quoted as follows: Chinese foundry iron, \$23; English and Continental, ordinary brands, \$22; No. 2 Southern foundry iron, \$20.

Old Material.—Cast iron scrap receives a little more attention, but is not yet moving freely, and there is a large accumulation on hand. Offerings of steel melting scrap are also too heavy for the local market, but there is a good foreign demand and the outlook in this line is good. Shipments of 5000 tons will be sent to Europe shortly, and contracts have been closed with coast melters for a very fair tonnage. Wrought scrap is moving in a limited way. Rerolling rails are in good demand. A contract has just been closed for 12,000 tons of old rails to be delivered to a coast rolling mill during the year. Prices are as follows: Cast iron scrap, per net ton, \$14; steel melting scrap, per gross ton, \$11.50; wrought scrap, per net ton, \$12.50 to \$15; rerolling rails, per net ton, \$11.

Buffalo

BUFFALO, N. Y., February 13, 1912.

Pig Iron.—Sales for the week, while not running in large amounts, have shown some improvement over the previous few weeks, and from reports received will aggregate 7000 to 8000 tons of foundry irons to New York State and Eastern points and Canada, a considerable proportion being low silicon and No. 3 grades. Some malleable orders have also come in, mostly for carload lots, one for 500 tons being taken at \$13.75. Buffalo. Inquiry also seems to be more general, as some of the larger buyers are sounding the market for shipment to July 1. It is apparent that on account of anticipating forward shipments on present contracts a good number of consumers will find gaps to be filled by supplementary orders between now and July 1. Shipments on specifications continue to be heavy, under urgent requests from users. The coke situation is becoming serious with some foundries on account of delay in deliveries by the railroads caused by the extreme cold weather. Canadian furnaces and foundries particularly are feeling the inconvenience and are more or less crippled in operation. Buffalo furnaces are not affected, having good stocks on hand. Prices of pig iron are fully as strong as at any time in the past month. We quote as follows for first half delivery, f.o.b. Buffalo:

| | |
|----------------------|--------------------|
| No. 1 X foundry..... | \$13.75 to \$14.25 |
| No. 2 X foundry..... | 13.75 to 14.00 |
| No. 2 plain..... | 13.50 to 13.75 |
| No. 3 foundry..... | 13.50 to 13.50 |
| Gray forge..... | 13.25 to 13.50 |
| Malleable..... | 13.75 to 14.25 |
| Basic..... | 14.00 to 14.50 |
| Charcoal..... | 15.75 to 17.25 |

Finished Iron and Steel.—The market in bar products is quiet, with less activity than reported last week. Such users as have not fully covered for second quarter requirements are apparently watching the market carefully and some of them have inquiries in. Specifications on contracts have been somewhat less in volume, but this is undoubtedly attributable to the extremely cold weather, which has caused temporary suspension of almost all classes of outside construction work. Business in wire products is good as regards specification on contracts placed in December and January. In sheets the demand is fair and prices are holding firm. There has been a considerable increase in demand for cold-rolled steel during the week in the way of immediate shipment orders, and also an unusually heavy demand for chain. Mills making the latter material are behind on orders, resulting in advanced prices being asked, approximating \$4 per ton. In fabricated structural material the market shows a little more activity than was the case last week and the indications are that it will continue to improve. A number of small jobs have been taken at well sustained prices. Bids are being received this week for the steel for an addition to the Sidway building, Buffalo, requiring 200 tons, and for the Buffalo Technical High School building, about 1000 tons, for which it is understood Bethlehem shapes will be used. Bids are to be taken next week for steel for the 8-story office building to be erected by the Buffalo Natural Gas Fuel Company, about 800 tons. Bids are also to be received shortly for

the steel for the Vendig Hotel, Philadelphia, for which Essenwein & Johnson, architects, Buffalo, are completing plans. The Lackawanna Bridge Company, Buffalo, has received the general contract for the erection of an additional car shop building for the New York Central Railroad at West Albany, requiring about 600 tons.

Old Material.—The market is held more or less in check by extremely low temperature and ice-bound conditions, which prevent the free movement of material at yards and in transit, and both consumers and dealers await more moderate weather before negotiating any volume of business beyond absolute necessities. Pending the resumption of more active dealings, there is no change in the price schedules. We quote as follows, per gross ton, f.o.b. Buffalo:

| | |
|--|--------------------|
| Heavy melting steel..... | \$12.50 to \$12.75 |
| Low phosphorus steel..... | 15.75 to 16.00 |
| No. 1 railroad wrought..... | 14.00 to 14.25 |
| No. 1 railroad and machinery cast scrap..... | 13.50 to 14.00 |
| Old steel axles..... | 18.50 to 19.25 |
| Old iron axles..... | 22.00 to 22.50 |
| Old car wheels..... | 13.00 to 13.25 |
| Railroad malleable..... | 12.50 to 12.75 |
| Boiler plate, sheared..... | 13.75 to 14.25 |
| Locomotive grate bars..... | 11.00 to 11.25 |
| Pipe and tank..... | 9.75 to 10.25 |
| Wrought iron and soft steel turnings..... | 7.25 to 7.50 |
| Clean cast borings..... | 6.50 to 6.75 |

Boston

BOSTON, MASS., February 13, 1912.

Old Material.—The market is unchanged, except that sentimentally it is somewhat weaker. Quotations have not been altered. The prices quoted below are those offered by the large dealers to the producers and to the smaller dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

| | |
|-----------------------------------|------------------|
| Heavy melting steel..... | \$9.00 to \$9.50 |
| Low phosphorus steel..... | 11.45 to 11.95 |
| Old steel axles..... | 14.00 to 14.50 |
| Old iron axles..... | 17.00 to 18.00 |
| Mixed shafting..... | 13.00 to 14.00 |
| No. 1 wrought and soft steel..... | 10.50 to 11.00 |
| Skeleton (bundled)..... | 7.00 to 7.50 |
| Wrought iron pipe..... | 8.50 to 9.00 |
| Cotton ties..... | 7.00 to 7.50 |
| No. 2 light..... | 4.50 to 5.00 |
| Wrought turnings..... | 6.00 to 6.50 |
| Cast borings..... | 5.25 to 5.75 |
| Machinery, cast..... | 12.50 to 13.00 |
| Malleable..... | 9.25 to 9.75 |
| Grate bars..... | 6.00 to 6.50 |
| Stove plate..... | 8.00 to 8.50 |
| Cast iron car wheels..... | 11.75 to 12.00 |

The German Iron Market

BERLIN, February 1, 1912.

The tendency in the iron market remains firm. A commission of the Pig Iron Syndicate to-day decided to declare a limited amount of Luxemburg iron open for contracts at advances. (Readers of this correspondence will recall the fact that the syndicate suspended taking new orders several weeks ago.) The advance is 1 to 2 marks at seacoast points and 3 to 4 marks for southern and central parts of the country, and in the Rhenish-Westphalian district. These advances are for the first half of the year, and no decision was taken for remoter dates. The trade combination controlling cold-rolled products has decided to begin doing business for the second quarter at an unchanged price of 205 marks. The Wire-Rod Association is also expected in a few weeks to open business for the second quarter at unchanged prices. From the Silesian district, on the other hand, it is reported that an advance of 2.50 to 5 marks a ton will be made in bars and plates a month hence.

The activity of trade has suffered no diminution at any point. Work is everywhere proceeding at a brisk pace, and both home and foreign consumers continue to send in inquiries and orders. Prospects continue good, and there are indications that spring business will be good. The favorable weather has made it possible to continue building operations with considerable regularity, and this has turned to the advantage of the iron trade. Notwithstanding the momentarily satisfactory position of the market, however, the trade reports begin to refer with some concern to possible developments of the remoter future. The huge increase in

the capacity of many works within a few years, together with the expansion still going on at others, has been calling for a large consumption of iron and steel by the works themselves. This has been a very important factor in swelling the production of iron; and when this ceases it will be very difficult to find a market for all the iron and steel that German works can produce.

The ore market is in good shape. In the Siegen district, where the highest-grade German ores are mined, production is on an increased scale since shipments to Silesia began a month ago. The combination of mine owners was therefore able to abolish the restriction on production hitherto maintained. The stocks of ores on hand there are also being reduced and a rise in prices for the second half of the year is looked for. The minette ores of Lorraine-Luxemburg have been slightly lifted in price, and foreign ores are very firm.

Calls for delivery of pig iron are unusually brisk. Foreign buyers are sending in good orders. Scrap is firm under a heavy demand, and the increased quantities coming upon the market in January were easily absorbed.

The specialties of the Steel Works Union have undergone little if any change within a fortnight. Calls for delivery of half-rolled steel are so urgent and of such large volume that the works can only with difficulty meet engagements on time. The export trade is progressing satisfactorily. The demand for grooved rails is somewhat slacker, as usual in winter; but the demand for rails for mines has improved, and so have prices. The foreign demand for structural shapes is very good; construction shops at home and abroad are calling for large quantities. The home demand for trusses and similar work for erecting elevated railroads is unusually active.

The pressure in the bar market is very heavy; as a rule the mills are stipulating 6 to 8 weeks to make delivery on specification. Consumers are complaining of delayed delivery. Not a few mills have orders running beyond June 30, and new orders are coming in at an unusually active rate. The position of the market for iron bars has also become better. The rush of work in heavy plates continues, and business in thinner qualities has grown so active that many mills have orders 4 or 5 months ahead. There is much work in tubing, but prices are still unsatisfactory. The same is true of wire rods.

The British Iron Market

Semi-Finished Steel Tending Upward—Standard Oil Inquiry for Tin Plates—Structural Steel Advanced

(By Cable)

LONDON, February 13, 1912.

The market is quiet but generally firm. The coal situation is still threatening, but efforts are still being made to avert a strike. Pig iron buying is light, but furnaces are pretty well sold, and the statistical situation is likely to improve. Cleveland warrants closed to-day at 48s. 10½d. Alabama iron is still offered here.

Semi-finished steel has an upward tendency. There is not much buying and at the same time foreign sellers are not seeking business. Welsh sheet bars have sold at £57s. 6d. for prompt delivery, though for forward delivery the quotation is £55s.

The European joist syndicate has raised prices 5s., and the present quotation is £615s.

The Australian Transcontinental Railway has inquired for 150,000 tons of rails. A Canadian order for 15,000 tons has gone to the Dominion Iron & Steel Company at Sydney, Nova Scotia. We quote rails at £516s. 3d.

The Standard Oil Company has inquired for 100,000 boxes of tin plates. Welsh mills asked 13s. 9d., which was refused. A large Eastern order has gone at that price. We quote the market for 14x20 tin plates at 13s. 6d.

(By Mail.)

LONDON, February 5, 1912.

The British iron and steel trades remain in excellent shape, although since the latter part of December there has been a rather quieter tone. But as this has been accompanied by increasing firmness it may be taken as an indication that conditions are sound and that it is only a matter of waiting a little for renewed activity to come into play. Just for the present the main factor causing the lull—the threatened national coal strike

—is still a restraining influence; but there are few people now who really believe in a general stoppage occurring, for the reason that the vital points of difference between employers and employed are too small to warrant an unyielding attitude being persisted in by either side.

Pig Iron Costs Higher

What will certainly result from the negotiations, however, is an addition to the cost of fuel, which will add to the cost of manufacture. As makers of Cleveland pig iron hold the opinion to-day that on the basis of current prices of raw material it costs somewhere about 48s. 6d. to 49s. to turn out No. 3 foundry it will be seen that with selling prices at 49s. 6d. there is not an extravagant margin of profit for them to-day. Some of the big merchant interests take a very rosy view of the future, and have backed their opinions in the last two or three months by making enormous purchases in the speculative market, treating as mere idle gossip the news which floats round from time to time that Alabama iron is being sold in big lots to Mediterranean ports. Many of the important Glasgow firms, however, are very much impressed by these sales, and it is a fact beyond question that when Southern iron goes to Italy and Austria it displaces European and chiefly Cleveland material.

Cleveland furnaces certainly do not want, at the present juncture, to find any of their outlets choked up with American iron, the more so since sales to Germany have been considerably restricted, doubtless in some measure owing to the German Pig Iron Syndicate proclaiming something like a boycott. A few weeks ago this syndicate informed the German iron merchants that if they wished recognition as customers of the syndicate they would have to confine their operations to the brands of the syndicated German manufacturers, and that the sale by merchants in Germany of any foreign pig iron would involve the cutting off of all home supplies. At present, however, German home trade is in such excellent fettle that the difficulty which consumers experience is to get supplies of raw material and before many days pass it is believed that the Pig Iron Syndicate will raise prices all round.

Firm Market for Billets and Sheet Bars

The situation in the market for half-finished steel, in which the United States has for some months cut a very important figure, is one of the utmost stringency. America, Germany and Belgium have each made large sales of billets and steel bars to the tin plate and galvanized sheet trades, and prices have been moving up steadily, until to-day the Stahlwerks, Verband demands 95s. f.o.b. Antwerp for such bars. The consumption in Great Britain has been so enormous owing to the wonderful activity of the tin plate trade that the Welsh tin plate works are to-day very awkwardly placed, where they have relied merely upon the output of the domestic steel works. Welsh bars, indeed, are in famine conditions, and are unobtainable for near delivery at any price, while the tin plate works are running only with difficulty and considerable irregularity. Fortunately the Steel Corporation is keeping step pretty steadily with delivery requirements, but is not pushing fresh business much at the moment, as the difficulty of obtaining freight room has been lately a seriously perplexing problem. Belgium has nothing to sell for months to come; the Government Syndicate is sold out for the first quarter, and is not at all an eager seller for April-June, while no relief is to be found from either France or Spain, which countries have on rare occasions sent small lots forward. Probably 107s. 6d. to 110s. a ton is the price of Welsh bars to-day for future delivery, say April-June.

Continental Export Prices

Prices of finished Continental material have a firm tendency and in recent weeks have risen very considerably. To-day No. 2 iron bars are 108s., bolt iron 113s., basic steel bars 109s., wire rods 111s., tees 112s., and plates 125s. a ton f.o.b. Antwerp. Some people are now inclined to look for a lull in buying and a temporary setback in prices, though the general market situation remains healthy and encouraging.

Welsh Tin Plate Losses to the United States

The Welsh tin plate manufacturers are very cross at the way in which Canadian and South American orders have been and are still being taken from them by United States manufacturers. This was one of the

great grievances of H. C. Bond, the London director of Richard Thomas & Co., of Llanelli, when addressing the electors of that town last week, seeking election to Parliament. The men of Llanelli, however, while sensible of the fact that Wales had lost trade with the United States, Canada and some other markets, were the more impressed by the net growth of the industry, last year's shipments (484,000 tons) constituting a record. So they rejected Mr. Bond and his tariff reform proposals. It is remarkable that the directors of a commercial undertaking which is paying huge dividends and making enormous additions and extensions to its plants all over Wales, and paying for them all out of revenue, should care to face their own workmen with a programme the adoption of which the workers believe would mean the downfall of the country as regards tin plate. And it is still more astounding that the directors should have taken up such an attitude, seeing that they have always been the largest buyers in the country of American and German sheet bars and that out of this relatively cheap material they have been able to make huge fortunes. However, tariff mongering is as ticklish a subject here as on the western shores of the Atlantic.

New York

NEW YORK, February 14, 1912.

Pig Iron.—With no particular evidence of a better demand or of an increase in foundry consumption, sellers of pig iron are yet doing a certain amount of business each week in lots ranging from 100 to an occasional 500 tons, and are looking for signs of a new buying movement which do not appear. Buffalo furnaces have been doing a fair business, but in eastern Pennsylvania little new demand for foundry iron has come up and the competition of one important producer is still felt by the strictly merchant furnaces. Pipe foundries are still the chief buyers. One interest in central Pennsylvania is in the market for basic iron. Its purchases for some time past have been divided between Southern and Northern furnaces. New England buyers seem to be well supplied with iron and the concessions made to them some weeks ago by New York State and Pennsylvania furnaces outside of the Lehigh and Schuylkill valleys have created an expectation of low prices. We quote as follows for Northern iron at tide-water: No. 1 foundry, \$15; No. 2 X, \$14.75; No. 2 plain, \$14.50 to \$14.75. We quote Southern iron at \$15 for No. 1 foundry and \$14.50 to \$14.75 for No. 2.

Finished Iron and Steel.—The price situation is weak, but notwithstanding there is general cheerfulness with the attitude that nothing very much is expected anyway of a presidential year. Nevertheless, local fabricators are quite busy figuring on new work, indicating that such weakness as there is comes from the little business offered by the railroads. There are numerous cases where plain material and plates are sold at a 1.20c. and 1.25c., Pittsburgh basis, although it is admitted that attractive orders would have to shade 1.15c., Pittsburgh, and might in an extreme case obtain 1.10c. In the case of recent large fabricating awards, it is considered that even less than 1.10c., Pittsburgh, for the plain material must have been secured. There are evidences that belated deliveries are occurring in the structural line, a fact which is regarded as encouraging to those who have not taken a very large share of the business. Very little new inquiry in the structural field has been made public, but quite a little work is said to be under way, and in addition to the large projects mentioned in late issues should be mentioned the Western Union Telegraph building at Broadway and Dey street, which will involve a total of perhaps 10,000 or 12,000 tons, although the building is likely to be erected in sections. No information is yet obtainable as to what will occupy the site of the Equitable Life Assurance building, the ruins of which are being demolished. Of recent awards in structural lines the American Bridge Company has received 2200 tons for the addition to the Bellevue-Stratford Hotel, Philadelphia; 1200 tons for the Stetson hat factory, Philadelphia; 1000 tons for the Amoskeag Savings Bank, Manchester, N. H.; 550 tons for a mill building for the West Boylston Mfg. Company, West Boylston, Mass.; 200 tons for four bridges for the Baltimore & Ohio and section 3 of the Lexington avenue subway involving perhaps 3000 tons of material. The power house near Mauch Chunk for the Lehigh Coal & Navigation Company, 2500 tons, is to be erected by the Belmont Iron Works. The Eastern Steel Company is to supply about 1000 tons for the Bushwick High School, Brooklyn; the National Bridge Works,

500 tons for the Shubert Music Hall, Forty-fourth street, and Milliken Brothers, 300 tons for transmission towers, Shelby Falls, Mass. The following represents quotations for the more attractive business: Steel bars, 1.31c. to 1.36c.; plates and plain structural material, 1.28½c. to 1.33½c.; bar iron, 1.27c. to 1.32c., all New York. Plain material from store, New York, 1.70c. to 1.80c.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company was the successful bidder under strong competitive conditions on 2900 tons of water pipe placed by the city of Boston, February 7. The city of Worcester, Mass., opened bids Tuesday on 3370 tons of 8 to 48 in. Pittsfield, Mass., will open bids February 19 on 2600 tons, principally 24 in. The volume of private inquiry continues quite heavy. These consumers have either found that their conservative purchases of the past few years have finally brought them to a point where they must heavily increase their requisitions or they have become convinced that present prices are too attractive to be neglected. Carload lots of 6 in. are quoted at \$22 to \$23 per net ton, tide-water.

Old Material.—The situation continues exceedingly discouraging to large dealers. It is believed that the fear of low duties on finished iron and steel is having some effect in checking purchases of old material, as makers of such products who are consumers of scrap argue that lower prices on it must inevitably prevail if duties should be reduced as heavily as attempted in the Underwood bill. Holders of scrap are trying to maintain values, but, on the other hand, whenever one is pressed to make a sale he is obliged to accept figures below our quotations. Dealers quote, per gross ton, New York and vicinity, as follows:

| | | |
|---|-----------|--------|
| Old girder and T-rails for melting..... | \$9.25 to | \$9.75 |
| Heavy melting steel scrap..... | 9.25 to | 9.75 |
| Relaying rails..... | 20.00 to | 20.50 |
| Rolling rails (nominal)..... | 11.50 to | 12.00 |
| Standard hammered iron car axles (nominal)..... | 20.00 to | 21.00 |
| Old steel car axles..... | 14.25 to | 14.75 |
| No. 1 railroad wrought..... | 12.00 to | 12.50 |
| Wrought iron track scrap..... | 11.00 to | 11.50 |
| No. 1 yard wrought, long..... | 10.00 to | 10.50 |
| No. 1 yard wrought, short..... | 9.25 to | 9.75 |
| Light iron..... | 4.00 to | 4.50 |
| Cast borings..... | 6.00 to | 6.25 |
| Wrought turnings..... | 7.00 to | 7.50 |
| Wrought pipe..... | 9.25 to | 9.50 |
| Old car wheels (nominal)..... | 12.00 to | 12.50 |
| No. 1 heavy cast, broken up..... | 11.00 to | 11.50 |
| Stove plate..... | 8.75 to | 9.00 |
| Locomotive grate bars..... | 9.00 to | 9.50 |
| Malleable cast..... | 9.00 to | 9.50 |

Ferroalloys.—There is some inquiry for ferromanganese for spot shipment, with sales confined to small lots. The market is firm and \$41, Baltimore, is the general quotation. Some sales were made during the week for small lots of 50 per cent. ferrosilicon and \$70 delivered at buyers' works. Stocks in hand are light and the market is strong at this figure.

Horton & Hennessy, who conduct a business in old iron, steel, copper and other metals at 27 Rutgers street, New York, acquired February 1 a yard 500 ft. square at Grove street and Morris Canal, Jersey City, N. J. The yard is located along the Lehigh Valley Railroad, and a track extends completely through it. It is equipped with two shears, which are electrically operated. The location is such that practically anything can be handled in the form of old iron and steel. The firm has also engaged in the business of wrecking buildings and has on hand some important work of this character. Arthur B. Horton, one of the partners, was connected 14 years with John Leonard & Co.

St. Louis

ST. LOUIS, MO., February 12, 1912.

While the market here, from the standpoint of new business, is in a waiting state there is no indication of depression, the belief being that second quarter requirements will begin to make themselves felt within a very short time. The movement on contracts is keeping up, with still a considerable tendency to seek anticipation of shipment. In no case is there any indication of a desire to hold back shipments, evidencing that the consumer is still busy.

Pig Iron.—The demand for pig iron already under contract during the past week has been good and no shipments are being held up. There has been the usual amount of small order business, running to a good aggregate. The new business for the week includes a sale of 600 tons of No. 3 Southern, for first half, which was made on an inquiry for No. 4, the latter being altogether out of the market and the former

being put by the seller at the price of No. 4. Another sale was of 300 tons of Northern foundry for delivery over first half.

Coke.—Shipments maintain a good volume and the price is well held at previous prices, the St. Louis market being slightly above other points on foundry grades. Sales of the week included one of 200 tons and another of 500 tons for foundry use. By-product coke is held at \$5.20 to \$5.25, but there is comparatively little moving just now.

Finished Iron and Steel.—In structural steel the movement has been halted somewhat in recent weeks because of the severe weather. Aside from this there is no slackening of the demand for material contracted for and prospects are excellent for new business when the weather lets up. Bars have been fairly active. In light rails the lumber roads have developed the most active demand that has been known for at least a year. Track fastenings have been in good request.

Old Material.—The market is beginning to show a tendency to weaken, though there has been no general reduction of prices so far. During the week something like 3500 tons was offered by the Missouri Pacific, Frisco, Wabash and Vandalia. The prices were slightly off from previous lists, but as about half of the total went direct to consumers, the dealers are maintaining their own quotations on such as they have on hand. We quote dealers' prices, f.o.b. St. Louis, as follows:

| Per Gross Ton. | |
|--|--------------------|
| Old iron rails..... | \$14.00 to \$14.50 |
| Old steel rails, rerolling..... | 11.50 to 12.00 |
| Old steel rails, less than 3 ft..... | 11.00 to 11.50 |
| Relaying rails, standard section, subject to inspection..... | 21.50 to 22.00 |
| Old car wheels..... | 13.00 to 13.50 |
| Heavy melting steel scrap..... | 10.50 to 11.00 |
| Frogs, switches and guards cut apart..... | 10.50 to 11.00 |

| Per Net Ton. | |
|---|--------------------|
| Iron fish plates..... | \$12.50 to \$13.00 |
| Iron car axles..... | 17.50 to 18.00 |
| Steel car axles..... | 16.00 to 16.50 |
| No. 1 railroad wrought..... | 11.00 to 11.50 |
| No. 2 railroad wrought..... | 10.00 to 10.50 |
| Railway springs..... | 9.75 to 10.25 |
| Locomotive tires, smooth..... | 11.00 to 11.50 |
| No. 1 dealers' forge..... | 8.00 to 8.50 |
| Mixed borings..... | 6.00 to 6.50 |
| No. 1 busheling..... | 9.00 to 9.50 |
| No. 1 boilers, cut to sheets and rings..... | 8.00 to 8.50 |
| No. 1 cast scrap..... | 8.50 to 9.00 |
| Stove plate and light cast scrap..... | 8.00 to 8.50 |
| Railroad malleable..... | 8.50 to 9.00 |
| Agricultural malleable..... | 7.50 to 8.00 |
| Pipes and flues..... | 8.00 to 8.50 |
| Railroad sheet and tank scrap..... | 7.50 to 8.00 |
| Railroad grate bars..... | 8.00 to 8.50 |
| Machine shop turnings..... | 7.50 to 8.00 |

The receivers for the Wabash Railroad entered the market today by sending out inquiries for prices on about 3500 freight cars, 50 passenger cars and about 50 new locomotives. The receivers are also in the market for about 25,000 tons of standard steel rails. Additional estimates are being made, for further betterment, but details are not forthcoming.

Metal Market

NEW YORK, February 14, 1912.

The Week's Prices

| | | Cents Per Pound for Early Delivery. | | | | Spelter | | | |
|-------------------|--------|-------------------------------------|-----------|-------|--------|---------|--------|-----------|--------|
| Copper, New York. | | Lead | | Tin | | New | | St. Louis | |
| Feb. | Lake. | Electro-lytic. | New York. | York. | Louis. | York. | Louis. | York. | Louis. |
| 8..... | 14.37½ | 14.25 | 44.00 | 4.00 | 3.97½ | 6.70 | 6.55 | | |
| 9..... | 14.37½ | 14.25 | 44.10 | 4.00 | 3.97½ | 6.70 | 6.55 | | |
| 10..... | 14.37½ | 14.25 | ..... | 4.00 | 3.97½ | 6.70 | 6.55 | | |
| 13..... | 14.37½ | 14.25 | 44.00 | 4.00 | 3.97½ | 6.70 | 6.55 | | |
| 14..... | 14.37½ | 14.25 | 44.00 | 4.00 | 3.97½ | 6.70 | 6.55 | | |

Copper is stronger, as a result of the Copper Producers' statement showing a further reduction in stocks of about 23,000,000 lb. Spot tin continues to be held at a premium, due to scarcity. Lead is still quoted at a low figure, with the independents reluctant to do business at the prevailing prices. Spelter is very strong, the demand for it running several months ahead. There is no change in antimony, Cookson's continuing to be quoted at a low figure.

New York

Copper.—Practically the only feature of the copper market since the last report was the statistical statement of the Copper Producers' Association which showed a further heavy reduction in stocks. The result was a better feeling, with a marking up of prices. The statement, however, was not productive of demands worthy of mention from consumers, and the market in the past week has been a drifting one.

It would appear that consumers are not using great quantities of copper and that they are covered for their early requirements. For Lake copper 14.37½c. is asked to-day and for electrolytic 14.25c. In London the quotation for spot to-day is £62 8s. 9d. and futures £63 2s. 6d. The exports of copper so far this month were 16,803 tons.

Pig Tin.—The scarcity of spot tin continues to be the principal feature in this metal. The market has been very quiet, in fact almost stagnant. For spot tin 44c. is asked and the price has been 44c. or over throughout the week. Tin now afloat and to arrive soon is offered only ¼c. to ½c. lower than spot. A great deal of tin is being shipped to consumers at interior points in the country on contracts heretofore made. The London price for spot tin to-day is reported at £198 10s. and for futures £192 15s. The arrivals this month have been 2935 tons and there is afloat 1460 tons.

Tin Plates.—The price of tin plates is slightly easier. A factor in the market has been buying by former subsidiaries of the Standard Oil Company. The price of 100-lb. coke plates is still quoted at \$3.64, New York, and tin plates laid down at Swansea, Wales, are quoted at 13s. 6d.

Lead.—The situation is practically unchanged, the American Smelting & Refining Company retaining its New York price of 4c. and getting the bulk of the business. Outsiders are not inclined to sell any more than they absolutely have to at the prevailing low price. The attitude of the independents is that the price of lead is entirely too low and must soon recover. The lower prices which have been operative for about 10 days caused a good demand for a few days, but it slackened this week. Lead in St. Louis is quoted at 3.97½c.

Spelter.—The scarcity of spelter continues and for prompt shipment 6.55c. to 6.60c., St. Louis, is asked and has been obtained. There is a much more active demand for spelter for future delivery than is usual, buyers looking ahead as far as May, June and July, for May and June delivery prices ranging around 6.50c. are asked. Some consumers have found difficulty in getting the metal.

Antimony.—No changes of importance have affected the antimony market in the last week, the relatively low price of Cookson's continuing at 7.25c. with an understanding that this price may be shaded. Hallett's is quoted at 7.50c. and Chinese and Hungarian grades at 6.90c.

Old Metals.—The market is steady and prices have been advanced on some articles. Selling prices are as follows:

| | Cents per lb. |
|---------------------------------|----------------|
| Copper, heavy and crucible..... | 13.25 to 13.50 |
| Copper, heavy and wire..... | 13.00 to 13.25 |
| Copper, light and bottoms..... | 11.75 to 12.00 |
| Brass, heavy..... | 9.00 to 9.25 |
| Brass, light..... | 7.00 to 7.25 |
| Heavy machine composition..... | 11.00 to 11.25 |
| Clean brass turnings..... | 8.25 to 8.50 |
| Composition turnings..... | 9.50 to 10.00 |
| Lead, heavy..... | 3.75 |
| Lead, tea..... | 3.50 |
| Zinc, scrap..... | 5.25 |

Chicago

FEBRUARY 13.—Transactions have been light and although we recognize in the revision of certain quotations some of the tendencies of the market the general situation offers little that is new. We quote as follows: Casting copper, 14.37½c.; Lake, 14.62½c., in carloads for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 45c.; small lots, 47c.; lead, desilverized, 4c. to 4.05c., for 50-ton lots; corroding, 4.55c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.50c. to 6.60c.; Cookson's antimony, 8.50c., and other grades, 7.50c. to 8c., in small lots; sheet zinc is \$8, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount, in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 11.75c.; copper bottoms, 10.75c.; copper clips, 11.50c.; red brass, 10.75c.; yellow brass, 8.50c.; lead pipe, 3.90c.; zinc, 4.25c.; pewter, No. 1, 26c.; tinfoil, 37c.; block tin pipe, 38c.

St. Louis

FEBRUARY 12.—The metal market has been in a most unsettled state, following the slump in lead. The quotation to-day stands at 3.92½c. to 3.95c., with a very quiet feeling. Spelter is better, being held at 6.45c. for spot and prompt shipment and 6.20c. to 6.35c. for future shipment. Tin is quotable at 44.60c., while Lake copper is well held at 14.72½c. and electrolytic at 14.60c. Cookson's antimony is still at 7.60c. The demand has

been good for most of these metals. In the Joplin ore market one of the most precipitous slumps in years took place in lead ore, the best offer for 80 per cent. galena being reported at \$48 per ton and ranging down to \$44, with many producers unable to find a market at any price. The district is proffering an enormous production and with piled up supplies. For zinc ores the situation was about as last week. Miscellaneous scrap metals we quote as follows: Light brass, 4.50c.; heavy brass and light copper, 8.50c.; heavy copper and copper wire, 9.50c.; zinc, 3.50c.; lead, 3.50c.; pewter, 20c.; tin-foil, 29c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, February 14, 1912.

The stock market for the past few days has been quiet, with a declining tendency, although on Tuesday a change for the better occurred. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

| | | | |
|--------------------------------|-----------|------------------------------|-----------|
| Allis-Chalm., com..... | 1 | Nat. En. & St., pref. 92½-93 | |
| Allis-Chalm., pref..... | 7 | Pittsburgh Steel, pref..... | 103¼ |
| Baldwin Loco., com. 50½-50¾ | 50% | Pressed Steel, com..... | 31 |
| Baldwin Loco., pref. 102¾-103 | | Railway Spring, com. 27½-28 | |
| Beth. Steel, com..... | 30½-31¾ | Railway Spring, pref..... | 104 |
| Bethlehem St., pref. 59-60¼ | | Republic, com..... | 20-21¼ |
| Can, com..... | 11½-11¾ | Republic, pref..... | 73½-77¼ |
| Can, pref..... | 91¾-92½ | Sloss, com..... | 40 |
| Car & Foundry, com..... | 51 | Pipe, pref..... | 50½-50¾ |
| Car & Foundry, pref. 115¼-115¾ | | U. S. Steel, com..... | 58½-61¼ |
| Steel Foundries..... | 28½-29 | U. S. Steel, pref..... | 107¾-108¾ |
| Colorado Fuel..... | 25¾-26 | Westinghouse Elec. 70-71¼ | |
| General Electric..... | 156½-157 | Am. Ship, com..... | 49½ |
| Gr. N. Ore Cert..... | 36½-38¾ | Am. Ship, pref..... | 102 |
| Int. Harv., com..... | 105½-106¾ | Chic. Pneu. Tool... 46¼-47¼ | |
| Int. Harv., pref..... | 120-121 | Cambria Steel..... | 42¼-43¼ |
| Int. Pump, com..... | 30 | Warwick..... | 11-11¾ |
| Int. Pump, pref..... | 79¾ | Crucible Steel, com. 11¾-11¾ | |
| Locomotive, com..... | 33¼ | Crucible Steel, pref. 81-82½ | |
| Locomotive, pref..... | 103¼-104 | Harb. Wk Ref., pref. 99-100 | |

Dividends Declared

The Niles-Bement-Pond Company, regular quarterly, 1½ per cent. on the common and preferred stocks, common payable March 20 and preferred payable February 15.

The Pratt-Whitney Company, regular quarterly, 1½ per cent., payable February 15.

The Studebaker Corporation, regular quarterly, 1½ per cent. on the preferred stock, payable March 1.

The directors of the United States Motors Company voted to pass the quarterly payment of 1¼ per cent., due to be paid February 10. The reason given is that heavy demands at this season for labor and materials make it seem wiser to retain the money for working capital.

Obituary

WALTER A. POST, president of the Newport News Shipbuilding & Dry Dock Company, and president of the Dominion Land Company, died suddenly at his home at Newport News, Va., February 12, aged 55 years. He was born at Kingston, N. Y. His first engineering work of importance was with I. E. White, contractor for terminal improvements on the Chesapeake & Ohio Railroad at Newport News. In 1890 he went with the Newport News Shipbuilding & Dry Dock Company as civil engineer, and under his direction the erection of the present plant was carried to completion. He was chosen president of the company in February, 1911.

S. D. CONOVER, a prominent citizen of Dayton, Ohio, and founder of the Miami Valley Machine Tool Company, died February 8, aged 69 years. Prior to a year ago he was president of the company, but retired from active business on account of ill health. He was mainly engaged in the coal business and was the oldest coal dealer in the city, but was also interested in a number of other enterprises. He leaves a widow, a daughter, and a son, P. P. H. Conover, the present head of the Miami Valley Machine Tool Company.

In the article in *The Iron Age* of February 8, page 359, on "Heat Treatment of Low Carbon Chromium Steel," in the third paragraph, the annealing temperature should have been given as 1300 deg. C. instead of 130 deg. C.

The G. E. Hoglund Foundry Company, Gardner, Mass., is now fully established in its new foundry, which is equipped with modern machinery, enabling it to make iron and brass castings of every size and description.

Personal

Frank P. Smith has again become associated with Manning, Maxwell & Moore, Inc., New York, and will give his efforts to the railroad department. L. H. Mesker, who has heretofore been connected with this corporation's Cleveland office, has been appointed manager of its St. Louis branch, with offices in the Frisco Building, succeeding C. L. Lyle. C. R. McCullough has joined the sales force and will make his headquarters in Detroit. He was formerly connected with the Packard Motor Car Company, Detroit, Mich.

S. L. Fuller, formerly president and general manager of the Friday Contracting Company, has been appointed general superintendent of the C. M. Neeld Construction Company, Oliver Building, Pittsburgh, Pa., organized last year to carry on a general contracting business, covering complete factory buildings, bridges and reinforced and plain concrete construction in general. Mr. Fuller's wide experience, including the construction of long span reinforced concrete bridges, will be of much benefit to this company, which has already built up a good business in its line.

James E. Howard, engineer physicist, Bureau of Standards, Washington, D. C., has returned from a trip to the Panama Canal Zone.

Howard W. Evans, formerly general manager of sales of the Crane Company, Chicago, has resigned to accept a similar position with the Best Mfg. Company, Pittsburgh, with works at Oakmont, Pa., making a specialty of piping materials for power plants.

Kilburn D. Clark, 75 Erie County Bank Building, Buffalo, N. Y., who has for the past five years represented the Harbison-Walker Refractories Company in New York State and Canada, has secured the representation in the same district for the General Refractories Company and the Brighton Fire Brick Company.

William Marker has resigned as secretary of the Superior Drop Forge & Mfg. Company, Cleveland, Ohio, because of poor health. He has been succeeded by A. K. Friend.

W. Lester Walker, formerly general sales manager of the Allegheny Steel Company of Pittsburgh, works at Brackenridge, Pa., has been made general manager, H. E. Sheldon having resigned. The other officers of this company now are: H. E. Sheldon, president; L. W. Hicks, vice-president; R. D. Campbell, secretary and treasurer. All departments of the plant, except the plate mills, are in full operation, with considerable work ahead.

First Vice-President Robert P. Lamont has been elected president of the American Steel Foundries to succeed William V. Kelley, who resigned and becomes chairman of the board.

Reed & Fears is a new firm formed to trade in pig iron, coke and alloys. The partners are Charles A. Reed and Albert S. Fears. The former has for 18 years been connected with N. S. Bartlett & Co., and the latter for 9 years with Hickman, Williams & Co. An office has been established in the Oliver Building, 141 Milk street, Boston, Mass.

Richard Peters, Jr., who has been assistant treasurer and purchasing agent of the company, succeeds James Bonnyman as vice-president and treasurer of the Birmingham Coal & Iron Company, Birmingham, Ala., which was recently acquired by the Woodward Iron Company.

Mahlow E. First, who has been connected with the Pawling & Harnischfeger Company, Milwaukee, has been appointed mechanical engineer of the Indiana Harbor, Ind., plant of the American Steel Foundries, succeeding B. H. Reddy.

Cadwallader Evans, Jr., formerly superintendent of power for the Henry W. Oliver Estate, Pittsburgh, has resigned to accept the position of superintendent of mines and plant of the Arcadia Coal Company at Pictou Harbor, Nova Scotia.

George H. Bryant, formerly with the Scully Steel & Iron Company, also J. T. Ryerson & Son, is now connected with Theodore Geissmann & Co., Inc., Commercial National Bank Building, Chicago, Ill., direct mill representatives, in the sale of iron and steel rolling mill products.

Clarence E. Clewell, for the past two years in charge of the design and installation of the extensive lighting work at East Pittsburgh shops of the Westinghouse Electric & Mfg. Company, has recently been transferred to the sales department of the company and is now engaged in illuminating engineering work in connection with the detail and supply department.

F. W. Boye, Jr., and W. T. Emmes have purchased the interest of W. A. Schumacher in the firms Schumacher & Boye and Schumacher, Boye & Emmes, Cincinnati, Ohio, and have incorporated a new company under the name of the Boye & Emmes Machine Tool Company, to take over these two concerns. Mr. Emmes has been connected with the firm of Schumacher & Boye as general superintendent for a number of years and has a wide reputation in the mechanical line. The firm Schumacher & Boye has been in existence for about 14 years.

F. V. McMullin, formerly connected with the Westinghouse Machine Company, and for some time superintendent of the Cleveland City Forge & Iron Company, Cleveland, Ohio, and also secretary of the Engineering Society of Western Pennsylvania, has been made secretary of the Pennsylvania Forge Company, Bridesburg, Philadelphia, and has entered upon the discharge of his duties.

J. R. Johnson, formerly superintendent of the Rockford Machine Tool Company, Rockford, Ill., has succeeded George W. Smith, who has resigned, as superintendent of the Ingersoll Milling Machine Company, Rockford.

James M. Cameron was incorrectly named as vice-president of the Central Iron & Steel Company in the article in *The Iron Age* of February 8 referring to the receivership of that company. Mr. Cameron resigned the vice-presidency in 1907.

George Langen, general superintendent of the Cincinnati Planer Company, Oakley, Cincinnati, Ohio, is making preparations to sail from New York March 19, for an extended business trip to Europe. He intends visiting England and every country on the Continent, and will probably be absent several months.

W. A. Comstock, secretary of the Cleveland Wire Spring Company, Cleveland, Ohio, left February 8 for California, where he will spend several weeks.

W. R. Warner, president of the Warner & Swasey Company, Cleveland Ohio, has returned from a trip through the Panama Canal zone. He gave a lecture on the canal before the Cleveland Chamber of Commerce February 13, illustrated with stereopticon views showing the progress of the work.

W. D. Sayle, president of the Cleveland Punch & Shear Works Company, Cleveland, Ohio, returned a few days ago from Mexico, where he had spent several weeks.

Fred H. White has been appointed purchasing agent of the Duluth, Missabe & Northern Railway Company, Duluth, Minn., effective March 1, in place of Sanford F. McLeod, who has resigned, after many years of faithful service, to engage in private business.

Ralph P. Moore has been appointed purchasing agent of the Duluth & Iron Range Railroad Company, Duluth, Minn., effective March 1, in place of Fred H. White, resigned.

L. F. Hamilton, advertising manager of the National Tube Company, Pittsburgh, who has been confined to his home for nearly three months with typhoid fever, is reported as slowly convalescing.

F. A. Haughton, formerly general superintendent of the Taylor Iron & Steel Company, High Bridge, N. J., has become works manager of the Ilion, N. Y., gun plant of the Remington Arms & Ammunition Company.

Herbert W. Gwyn, who was for years connected with the Richard Heckscher & Sons Company, Philadelphia, Pa., operating Swede furnaces, and who was secretary of the company when it was taken over by the Alan Wood Iron & Steel Company, has severed the connection.

W. R. Glasgow has resigned as works manager of the Canadian Steel Foundries, Ltd., at Welland, Ont., to go into other business.

Machine Tool Builders' Tariff Hearing

Testimony of Machine Tool Builders Before
the Senate Finance Committee at Wash-
ington, D. C., Tuesday, February 13, 1912

In the presence of a gathering of machine tool manufacturers and their representatives that crowded a spacious room in the office building of the United States Senate in Washington, D. C., Fred A. Geier, of the Cincinnati Milling Machine Company, February 13, before the Finance Committee of the United States Senate, voiced the opposition of the machine tool manufacturers of this country to the proposed new tariff schedule which would place machine tools on the free list. Mr. Geier was the only one to present testimony on the subject and he had not concluded when recess was taken. Mr. Geier was introduced to the committee by Congressman Nicholas Longworth, of Ohio, who made a brief statement showing what is involved in the question under consideration and what was expected to be proved. Mr. Geier presented his subject in a forceful manner and was congratulated by the machinery men when recess was announced. He appeared prepared to answer almost any question that might be raised with regard to the machine tool industry. An almost verbatim report is given below.

Statement of Congressman Nicholas Longworth.

MR. LONGWORTH. I have been asked to make a very brief statement showing just exactly what is involved in this question that these gentlemen desire to bring to your attention. First, I will direct your attention to paragraph 73 of the present bill. In the Payne law most of the articles described were in paragraph 197, namely, cash registers, jute manufacturing machinery, linotype and all typesetting machines, machine tools, printing presses, sewing machines, typewriters, and all steam engines, 30 per cent. ad valorem. In the present bill cash registers, linotype and all typesetting machinery, machine tools, printing presses, sewing machines, and typewriters are put on the free list, so that the substantial difference between the two paragraphs to-day would be that jute manufacturing machinery is left dutiable at 30 per cent. and steam engines at 15 per cent., all the other articles going on the free list. Machine tools are the articles in which all these gentlemen who appear here are interested. It is an industry that has a very wide range in this country, and it is generally said that the headquarters of the industry is in southern Ohio. That is the fact, is it not, Mr. Geier?

MR. GEIER. I will give some figures after a while.

MR. LONGWORTH. At least, it is a very important industry in that part of Ohio. The reasons that have been advanced by gentlemen in charge of legislation in the House, at present, for putting the finished product of an American industry on the free list, and, at the same time, leaving the duty on every article that goes into the finished product, have been either that it was a trust, that there were no imports of the article and large exports; or else that it was protected by patents. These gentlemen will be able to show you, first, that there is no protection whatever, by patent; second, that there is no combination, or any thought of combination, in this industry; it is one of the most fiercely competing industries, of very wide range of territory, in the country. And, third, that while in the past exports have been very large and the imports comparatively few, that ratio is changing and will undoubtedly change should machine tools go on the free list. They will show you that within the last few years Germany is making almost exactly the same type of machine tool that is being made in this country, making them with very much cheaper labor. Not only do they fear that if machine tools go on the free list they will lose largely the export trade, but that they will not even be able to keep the home market.

SENATOR CLARK. Mr. Longworth, just what is included in the general term "machine tool"?

MR. LONGWORTH. That is a question I am going to leave to these gentlemen to discuss. Unfortunately, it is a very hard definition to give. It seems that the trade definition and the Treasury definition do not exactly agree, and for that reason it will be rather difficult to give the amount of exports or imports. The machine tools, however, in which these gentlemen are interested are used, I think I am correct in saying, in manufacturing metal.

MR. WALTER. Metal cutting.

MR. LONGWORTH. Metal cutting; whereas under the broad term "machine tools," as interpreted by the Treasury definition, it would include also wood working machinery and every type of machinery of that kind. So that under any circumstances the term "machine tools" is broad enough to cover the article made by these gentlemen, and, in addition, a great many other articles. They desire to be closely questioned on every proposition involved, and I will introduce Mr. Fred A. Geier, of the Cincinnati Milling Machine Company.

Statement of Fred A. Geier.

SENATOR CULLOM. Whom do you represent?

MR. GEIER. I represent all the machine tool builders in this country. They have placed the burden upon me to present to you gentlemen the arguments we have to place before you in this matter of the proposed bill which is under consideration at this time. Taking up some of the questions that were asked by Mr. Longworth, I would like to state that since I have been in Washington I confess that my own ideas as to what a machine tool is have been very much confused. But these gentlemen whom I represent here this morning have had, in the past, an interpretation of the word "machine tools" that I say is different from the one I have been getting in Washington since I have been here. In other words, in talking with your statisticians and with Congressmen and others, and looking over the recent decisions on the part of the customs appraisers, and even the decisions of the Court of Customs Appeals, I no longer know what a machine tool is. But I might say this, to give you some sort of an idea, that you could not operate a railroad, you could not run a steamship, you would not have a telegraph or a telephone or an electric light, you could not plow the fields in the West, you could not do any of the mechanical things that are going on in this country, that have developed the United States to its present position, if you did not have machine tools. Take away the machine tools, and America would be powerless to protect itself against any foreign invasion. There is no battleship that goes out that is not fundamentally dependent upon the use of machine tools. So, while it is difficult for us at this time to describe to you in detail what a machine tool is, the uses of a machine tool extend into every avenue, and especially in every industrial vocation in this country. As we go along, I hope to make you more familiar with what a machine tool looks like, because it is exceedingly important, I think, at this time, that you shall have a fairly clear idea of what machine tools are.

Briefly, I want to make this statement, that up until the Payne bill of 1909 machine tools were in the general classification of metal working machinery. Some of the manufacturers of machine tools who were alert and were constantly watching the foreign market, and seeing what was developing there, found that the tendency on the part of certain of the foreign countries was to raise their tariffs against us. With that in mind, and also believing that we

were so sure of our own ground, we went before the Ways and Means Committee in November, 1908, and voluntarily suggested that if we would put into the hands of the Government the opportunity of treating with other nations for a moderate tariff against us, it would be proper for us to have our duty reduced from 45 to 30. As a result of that, the present tariff is a minimum and maximum of 30 and 37½ per cent.; 30 to the countries that favor us, and 37½ to the others.

SENATOR SIMMONS. Do you speak of general minimum and maximum in the bill, or a special minimum and maximum applying to your industry?

MR. GEIER. For the first time in all tariff acts machine tools were given a special classification. Going back through all the tariff acts, machine tools were classed in a general clause, "manufactures of iron, steel, not otherwise specified," and always had a tariff of 45 per cent., with one exception, the Wilson bill reducing it to 35. It was not until the voluntary suggestion on our part to the Ways and Means Committee of 1908 that the tariff was reduced to 30 per cent. In consideration of making arrangements with other countries for a reduction of their tariffs against us we suggested we would be perfectly willing to have our tariff reduced from 45 to 30. I want to say right here that the manufacturers at that time—I do not think we are to be blamed for that—could not and did not foresee the rapidity of the progress that particularly the German nation has made.

SENATOR HEYBURN. That was in the interest of the exporters, was it not, that proposition of yours? MR. GEIER. Yes, sir.

SENATOR HEYBURN. And you disregarded the interests of the small manufacturers all over the country in order that the exporters might have that advantage in the foreign market?

MR. GEIER. No, I think not. At that time the sentiment of the machine tool manufacturers was this, that, having originated the machines, being the first to organize the manufacture of them, we would be able to keep out the foreign importation of machine tools with a duty of 30 per cent.

SENATOR HEYBURN. You did not do it, did you? MR. GEIER. No, we did not. I simply say we did not at that time foresee the rapidity with which the German nation would progress since that time. But I do not think we should be penalized now for what we thought was rather a patriotic act.

SENATOR WILLIAMS. One word right there before you pass by. You say you did not keep out the imports of machine tools from foreign countries; you are still exporting machine tools, are you not?

MR. GEIER. Yes, sir. Right here, if it would be entirely agreeable to you, we have prepared our case very thoroughly, and it is in sequence, and every question, I think, that you could possibly raise will be more or less answered in the statement as we go along. I should be very happy, after we finish our statement, to answer any and all questions.

SENATOR HEYBURN. I think the members of the committee will have to treat this thing each according to his own ideas, as to what will give him the information he wants; and I think it is better for the suggestion to be made appropriate to the stage of consideration that you reach.

SENATOR WILLIAMS. I wanted this information because it immediately follows logically upon the information that the Senator was desiring to get. You still export machine tools, I understand. What is the amount of these importations of machine tools to which the Senator referred?

MR. GEIER. The amount of importation of machine tools has only been classified in the statistics since 1909. Beginning with 1910 the imports were \$177,000; in 1911 the imports were \$191,082.

SENATOR WILLIAMS. What were the exports for those two years?

MR. GEIER. The exports of machine tools, I do not know how much. The machine tools, in the figures of the Government, are included in the export figures of metal working machinery, including machine tools.

SENATOR WILLIAMS. Under that very report there,

where they put the imports, they also put the exports, do they not, referring to the same articles?

MR. GEIER. No, there is another statement. Please recall that metal working machinery exports include other things beside machine tools.

SENATOR WILLIAMS. So did the imports, did they not? MR. GEIER. No; I am trying to make that clear.

SENATOR WILLIAMS. The same phraseology is used as to both, is it not? MR. GEIER. No. The imports are scheduled under machine tools, the exports under metal working machinery, which includes machine tools. The exports of metal working machinery in 1910 were \$5,975,000; in 1911, \$9,626,000.

SENATOR WILLIAMS. The exports were five million and something and nine million and something, and the imports were less than \$200,000 in each year? MR. GEIER. Yes, sir; not on identical terms.

SENATOR SIMMONS. You read the imports of machine tools. Now I ask you if there are any imports of metal working machinery?

MR. GEIER. I cannot answer that question, because the Treasury decisions are letting in under that clause now machines that formerly in the trade we did not classify as machine tools. What part of that it is I cannot say, because I cannot get from the Government officials any items as to either the exports, classifying them by the different machines, or as to the imports.

SENATOR HEYBURN. What is it according to the Treasury statement, according to their classification? MR. GEIER. Machine tools.

SENATOR SIMMONS. You stated that exports, as it appeared in the Treasury statement, were metal working machinery. MR. GEIER. Metal working machinery, including machine tools.

SENATOR WILLIAMS. What, in your opinion, is the proportion of machine tools to other metal working machinery in those exports?

MR. GEIER. I made the statement some time ago, off-hand, that I thought the total exports of machine tools, as we understand them, to all parts of the world, would not exceed \$5,000,000. We have since that time made some more careful analysis, and I feel quite sure that my first statement is more than sufficient to cover the exports of machine tools we make.

SENATOR WILLIAMS. Would you change that estimate now?

MR. GEIER. If anything, I would make it a little less. I might make it \$4,500,000. I think that would be nearer right than \$5,000,000. Unfortunately, I have not got from the Government offices any figures on that point to be accurate. I want to say here, gentlemen, that the American engineer, with his inventive ability, supported by the progressive and aggressive spirit and enterprise of American capital, was the pioneer in bringing the modern machine tool to its present high productive capacity. He not only gave to American industry in all its forms, but also to the industries of the world, the instruments by means of which the cost of all manufacturing has been greatly reduced. We do not claim in our industry that we invented the loom, the cotton gin, the shoe-making machine, the locomotive, or the electric motor, but, gentlemen, it is a fact that by the use of our product we have tremendously contributed to reduce the cost of all these articles, and assisted in making possible and broadening the commercial use of them. This work that we have done has been done at a tremendous expense to the American tool builder. It is impossible to give any figures, but it would certainly run into the millions of dollars. In fact, as one characteristic of the American tool builder, he is constantly inventing and perfecting new machinery, to his credit; he takes the lead in the world along the line of creating new machinery. I want to say right here that it would be a conservative statement that 5 per cent. of the total cost of our production is to be found in that continuous work of invention and development of the American machine tool. Unfortunately, it being an old industry, we cannot get any fundamental patents, and therefore we are making this contribution to the world without any opportunity of protecting ourselves and getting paid for the work we are doing.

I want to say here that this industry, which represents an output possibly of \$40,000,000 and a capitalization of about the same, is divided among about 225 concerns in the United States.

SENATOR SIMMONS. Those 225 concerns are distinct; they have no connection one with the other?

Mr. GEIER. They are absolutely distinct and separate, and they are fighting the good fight of competition as keenly and as honestly as anybody could possibly expect them to do.

SENATOR HEYBURN. But they all agree on the tariff question, and they sent you here to represent them all, your interests being mutual?

Mr. GEIER. Our interests are absolutely mutual in this matter. They simply have delegated me to place before you as best I can their reasons for asking reconsideration of this bill. And now I want to say here, before we go any further, and before you make any false conclusions, the exports last year of machinery, and even part of the year before, were larger than ordinarily, and I will show you later on the fluctuation in the exports of machine tools is due to the fact that England and Germany are enjoying a period of prosperity such as they have not had for a decade, and, at the same time, we in this country have been running at about a 60 per cent. production. Business is so dull that we have machines in this country for immediate delivery; whereas the English and German manufacturers were so filled up with orders that they could not deliver promptly, and that gave us the opportunity for temporarily again raising our export figures. It is a temporary condition. That should be analyzed.

SENATOR HEYBURN. You could beat them to their own customers, could you? Mr. GEIER. In the matter of time.

SENATOR McCUMBER. What are your chief countries of export?

Mr. GEIER. England, Germany and France. That needs to be understood, and I hope you will be patient enough to allow me to present to you clearly why it is we are to-day still exporting machines into those countries, and what the machines are we are exporting there. We want to show you that the machines we formerly exported to Germany and England have disappeared from our export trade; that because, however, the American engineer and American machine tool builder is constantly putting on to the market new types of highly organized and highly productive machines, what business he has to-day is on the newer types of machines that are not yet duplicated in the other countries; that the old business we formerly had is gone, and that therefore when you look in the export figures to-day, as contrasted to 10 years ago, you must remember that it is in a measure entirely a different product, although it is still called "machine tool." Furthermore, an analysis would show this, that out of the 225 concerns, a large part of which 10 years ago exported machinery abroad, the number has narrowed down, and there are comparatively few concerns left in the machine tool industry that still are exporting machines; and those concerns are only exporting such machines, as I say, in number, in quantity, that would amount to anything, that are of the newer type, more highly organized machines, that have not yet had their duplicates in Europe.

SENATOR McCUMBER. Will you explain to the committee whether or not you are selling your products cheaper in the export markets than you are in the home, domestic market?

Mr. GEIER. Yes, sir; we will be glad to explain any and everything to you that we can.

SENATOR SIMMONS. It seems to me it would be much more helpful to the committee if you would explain it now. I would like to know whether you are selling cheaper in England, France and Germany than you are selling here.

Mr. GEIER. All right. May I finish, however, this first statement, to show how the machine tool business is distributed geographically, and also by firms, to show clearly to your minds that it is a highly competitive business? I have here nine firms, with a capitalization of over \$1,000,000; 3 between \$750,000 and \$1,000,000; 11 between \$500,000 and \$750,000; 19 between \$300,000 and \$500,000; 20 between \$200,000 and \$300,000; 26 between \$125,000 and \$200,000; 18 between \$75,000 and \$125,000; 17 between \$50,000 and \$175,000; 20 between \$35,000 and \$50,000; 21 between \$20,000 and \$35,000; 11 between \$10,000 and \$20,000; 5 between \$5,000 and \$10,000; 1 between \$3,000 and \$5,000, and 42 even less. The States are figured like this: Ohio has 58; New York, 22; Connecticut, 22; Massachusetts, 39; Illinois, 15; Pennsylvania,

16; Rhode Island, 6; Michigan, 8; Wisconsin, 10; Indiana, 7; Delaware, 3; Vermont, 4; New Jersey, 7; Maryland, 1; New Hampshire, 2; Iowa, 1; Maine, 2; Missouri, 1; in other words, 18 States.

Now, a Senator has inquired as to the matter of price. I want to say that I cannot give you any exact figures as to what each one of these manufacturers is doing as to his export business. I can make this statement, that the American machine universally costs more to the user abroad than it does to the user here.

SENATOR SIMMONS. You state that you sell the American machines higher in Europe than you do here?

Mr. GEIER. The customer pays more money because of the cost of transportation, the cost of the duty, and the cost of selling.

SENATOR SIMMONS. Your own selling price in Europe is higher than it is here?

Mr. GEIER. The user in Europe universally pays more money for the machine there than the user would pay for it in this country.

SENATOR SIMMONS. That means the price is higher than it is in this country? Mr. GEIER. Yes.

SENATOR JOHNSON. How about your selling price? Mr. GEIER. Our selling price is somewhat modified for the European business in such cases, where the European agent takes upon himself some of the costs of the selling.

SENATOR SIMMONS. Are you afraid of European competition in these machines in the face of the fact that you sell these machines higher in Europe than you do in America?

Mr. GEIER. I did not say we sold these machines higher in Europe than we did in America. I simply said to you that the customer in Europe, because of the cost of transportation, freight, and so forth, and the selling cost, pays a higher price for the machine in Europe than the customer here in this country.

SENATOR CLARK. Where do you fix your price? Mr. GEIER. At New York.

SENATOR CLARK. What I would like to know is this, at New York, where you fix your price, and where your delivery is made, what is the difference between the cost to the foreign purchaser and to the domestic purchaser?

Mr. GEIER. In our own case, and I think this is pretty universally true, the cost of the freight from the factory to New York, and for packing, boxing, and so forth, is possibly in some instances 5 per cent. higher than the American dealer would pay for the same machine in New York.

SENATOR CLARK. In other words, the price of your machine furnished to the foreign consumer at the point of delivery is not higher than the price paid by the American buyer.

Mr. GEIER. Remember this, that a good many of our machines are not sold direct to the customers; they pass through agents' hands.

SENATOR CLARK. Can you not answer this question: Your point of delivery, where the product passes out of your hands, and at which the price is fixed that is to come to your manufacturing concern, is New York? Mr. GEIER. Yes, sir.

SENATOR CLARK. That takes in nothing as to ocean freight; it takes in nothing as to the cost of selling in the other country? Mr. GEIER. No, sir; nor the duty.

SENATOR CLARK. What I am still trying to get at is, your selling price is the price of your goods in New York; is that it?

Mr. GEIER. We get less returns from the shipment abroad, because we make the delivery in New York City as opposed to the f.o.b. factory price for the domestic trade, and we absorb the cost of the packing, and in some instances make a further discount to the foreign agent to help him in his selling expense.

SENATOR SIMMONS. If you send to Europe your product, the freight rates have to be paid before the European customer buys, and added to the price he pays? Mr. GEIER. Yes, sir.

SENATOR SIMMONS. If a European producer sends his product over here, he has to do the same thing, has he not? Mr. GEIER. Yes, sir.

SENATOR SIMMONS. So that the fact remains that the price of this article, your product, which you export, is higher in Europe than it is in this country? Mr. GEIER. Yes, sir.

SENATOR SIMMONS. Then why are you afraid of that competition. Mr. GEIER. I submit that does not argue our case at all.

SENATOR SIMMONS. You are afraid of competition with a country where your product sells higher than it does in the domestic market?

Mr. GEIER. How could it help but sell higher in Germany, when I am just through telling you that the customer abroad must pay for the transportation and the duty and the cost of selling?

SENATOR SIMMONS. If the producer over there wants to send his product to this country and sell it in competition, he has to pay those charges, does he not? The freight from Europe to America is as great as the freight from America to Europe.

Mr. GEIER. It is a little less.

SENATOR SIMMONS. Why is that?

Mr. GEIER. Because the German Government owns 95 per cent. of the railroads, and it is a well-known fact—we have the figures here—that both the freight and the inland water rate from factory centers to the seaboard in Germany, delivered to the steamship company, are about one-half what they charge for a local shipment.

SENATOR SIMMONS. There is a little difference against the Americans in the distribution and transportation cost after the article reaches the German coast.

Mr. GEIER. Let me make this clear to you, emphasize it again. We are claiming that our exports to Europe are largely confined to highly specialized and highly organized machines, such as are not as yet made to compete by the German makers; that the Europeans are making excellent machines of the kind and type that we shipped over there 10 years ago; that they are manufacturing those machines to-day at a cost very much under ours, and the removal of the tariff would not bring into this country immediately the highly organized machines, because they are not making them over there, but it would bring into this country a type of machine in which probably 75 per cent. of this trade is engaged to-day in making.

SENATOR SMOOT. And where there is one of those highly manufactured machines made by the tool makers of this country and exported to a foreign country, there are twenty-five or fifty of the other class that can be made by a foreign country, and without the tariff would be shipped in here in competition? Mr. GEIER. Precisely.

SENATOR JOHNSON. American ingenuity and inventiveness is all the time at work making large progress in machines and machine tools of all kinds, and you are constantly discarding those made 10 years ago, in manufactures of all kinds?

Mr. GEIER. That is a very general statement that is unfortunately doing our whole country a tremendous amount of harm. We are constantly harping upon the idea that the genius, the invention, and also the skill of the workman are so superior to those of foreigners that we are unfortunately coming to conclusions that are not founded upon fact; and it must be borne in mind, and we are perfectly willing to show you—we have the data here to give you a clear idea of this whole matter—that a country like Germany, for which I have the highest respect, a country that is so scientific in everything that it does, a country that is, from an industrial standpoint, to-day the wonder of the world, enjoys a cost of production that we unfortunately do not have in this country. And that we cannot overcome the tremendous difference in the cost by our ingenuity and by our automatic machines, because she is so quick to use the same instruments that we use in the processes of our manufacture. I want to show you all that as we go along.

SENATOR SIMMONS. Does that agree with your statement just made that we were the pioneers who invented these new machines and introduced them here, and then Germany and England and the balance came in and copied them? That is what you said.

Mr. GEIER. I do not retract what I said.

SENATOR SIMMONS. It is not your argument that Germany is so much superior to us in inventive genius?

Mr. GEIER. I do not say that. I say that Germany, by her example, and as she testifies herself—as I will produce later on—has taken from the American, by the example of organization of types, the development of manufacturing processes, taken the example of America and quickly has followed the American in his footsteps, and

with such rapidity as I say to you that we in 1908, when we suggested this modification of a 45 per cent. rate to a 30 per cent. rate, ourselves did not realize the rapidity with which she would make that progress.

SENATOR SIMMONS. Then if I understand you correctly, Mr. Geier, your proposition is simply this, that you are able to export to those countries, Germany and England, only an advanced type of machine, which is superior to anything they have at the present time; but that as in a very short time they will copy these same machines, you cannot export, unless you are able to still advance something beyond what they have produced; and that would be some particular type of machine?

Mr. GEIER. It is not only the fact that we are making machines of more advanced type, but in some cases we have plants in this country for the production of machine tools that are so finely organized that they produce a quality of product that is not yet equaled in Germany. There are distinctions, you see. You might have a comparatively simple machine, but in which the requirements for accuracy were so great that Europeans would buy the machine because it had been developed to the highest degree of accuracy.

SENATOR McCUMBER. That would be an advanced design?

Mr. GEIER. It would not only be an advanced design, but a degree of refinement in manufacture that they have not equaled yet.

SENATOR SIMMONS. You do not mean to say that you are exporting to Europe now only such types or qualities of machine as Europe has not been manufacturing?

Mr. GEIER. That has to be explained. There are fifteen manufactories of milling machines in Germany. There are still American milling machines sent to Germany because the American milling machine was the most highly developed machine, not only as to design, but it reached a degree of accuracy such as is not even yet equaled in Germany. And that machine requires a high degree of accuracy. I am proud enough to disclaim that Germany has equaled the American manufacturer of milling machines for refinement and degree of accuracy. But I must admit this, that the German milling machine maker, during the past 10 years, has made tremendous advances, and that he is daily and yearly taking away some of the market in Germany that the Americans formerly had. In other words, that our market in Germany for milling machines that are highly developed, finely made, is constantly getting smaller and smaller.

SENATOR SIMMONS. But you do not say that you export to Europe only machines of a type and quality that are not made in Europe? Mr. GEIER. No.

SENATOR SIMMONS. Then there is European competition in Europe with your exported machine?

Mr. GEIER. Yes; worse than that, gentlemen, the competition in Germany is something terrific. But already we are having something of the competition right here on our own shores, with the 30 per cent. tariff against them.

SENATOR SIMMONS. Are you making as much profit on your machines shipped to Germany as on your machines sold in this country?

Mr. GEIER. We think we make fully as much, because the foreign dealer in our machine assumes a great many costs of marketing that machine that here in our own country we ourselves assume.

SENATOR McCUMBER. Right on that point, do you sell to the wholesale market in New York, or do you handle your business only through agencies?

Mr. GEIER. We handle our business only through agencies. There is no wholesaling of machine tools. There might be some exceptions to that on the part of some manufacturers who are represented here to-day. Some sell direct.

SENATOR HEYBURN. No one buys them and holds them for a market? Mr. GEIER. No.

SENATOR HEYBURN. You sell on orders? Mr. GEIER. Yes.

SENATOR SIMMONS. You do not mean to say you sell altogether to the man who is going to operate the machine?

Mr. GEIER. Yes, sir; direct to the man who is going to operate the machine, or through a dealer who buys the machine for the consumer. Some dealers buy machines outright and put them in stock. But the majority of

machine tools to-day are only ordered from the manufacturer after the dealer has made a sale to the customer.

SENATOR SIMMONS. If a dealer of the character you spoke of has sold to his customers a given number of machines, and then orders that number from you, he has paid all the expense of selling himself, has he not? Mr. GEIER. Yes.

SENATOR SIMMONS. You sell to him upon the same principle that you sell to any wholesale dealers who might order that number of machines?

Mr. GEIER. We do not have any wholesale dealers. We have representatives whom we call dealers, and they, of course, get a better price than the consumer gets, 10 per cent. in our case, which is given them to pay for their cost of traveling men, office rent, etc.

SENATOR SIMMONS. A man of that character would be a middleman? Mr. GEIER. Yes, a manufacturer's agent.

SENATOR SMOOT. If you did not have that manufacturer's agent, you would have to send a man there from the mill to solicit that trade?

Mr. GEIER. Yes. Now, gentlemen, I would like to have you go with me for a moment to investigate the cost of producing machine tools. The cost of a machine tool is made up, of course, of material and labor. We have taken the trouble to get data from 67 concerns in answer to certain inquiries, and the figures we have gotten would indicate that the average percentage of material in a machine tool is equal to 27.2 per cent. of the cost of that machine, leaving 72.8 per cent. to represent the cost of labor and overhead. The cost of labor is the big item, as you will see, in this proposition.

SENATOR HEYBURN. You have not made that plain, because you have included labor and overhead charges in the same item. I would like to have you separate the overhead charges from labor so that we will know what the labor really is.

Mr. GEIER. We have it separated like this: The labor, 38.3 per cent., and labor overhead, 34.5 per cent.

SENATOR HEYBURN. You mean salaries there? Mr. GEIER. Oh, no. In every plant you have what we would call direct labor and indirect labor.

The CHAIRMAN. Of what does the overhead labor consist?

Mr. GEIER. Overhead manufacturing expenses of all sorts, truckers and laborers and such expenses in the way of purchase of tools that go into the use of the machine.

SENATOR WILLIAMS. Taxes? Mr. GEIER. No, sir. This could properly be put into the manufacturing costs.

SENATOR WILLIAMS. Where do your taxes come in, where does your rent come in, where do your traveling salesmen come in? Mr. GEIER. Those would come into commercial expenses, the traveling salesmen.

SENATOR WILLIAMS. Are your expenses to be added to these other two items? If they are, you will get over 100 per cent. total cost of production.

Mr. GEIER. These figures, exactly as we have given them to you, are 100 per cent. in this total cost of a machine. We figure 27.2 per cent. represents the labor, and 38.3 per cent. represents the direct labor and the overhead expense, which includes, of course, indirect labor and some properly chargeable expenses to manufacturing, 34.5 per cent. A machine has to be sold; it has to be advertised; it has to be marketed, and the account has to be collected, and a lot of other things come in before we really get the returns. I am trying to show you here, in comparison with the European changes, the difference in the cost between producing machines here and producing them abroad.

SENATOR JOHNSON. That is the cost at the factory? Mr. GEIER. At the factory.

SENATOR CLARK. What are your overhead charges, what you speak of as overhead charges?

Mr. GEIER. All the non-productive labor in a plant that you cannot specifically charge to a given thing in the manufacture of the article.

SENATOR CLARK. That is, superintendents?

Mr. GEIER. Superintendents, foremen, timekeepers, truckers, shipping clerks, elevator men, etc. That is about one-third of the men employed in the plant that you would call non-productive labor, which goes into the overhead. Then you have, of course, charged in there also the using up of files, emery cloth, cutters and things of that sort,

used up in the production of these machines, which are labor items.

SENATOR CLARK. What I was trying to get at was this, that the real labor cost was more than 38 per cent. Mr. GEIER. Exactly.

SENATOR CLARK. So the real labor cost is not only the 38 per cent., but such portions of the overhead charges as go on the salary list, aside from the labor?

Mr. GEIER. The actual labor cost, as nearly as you can figure it, will certainly run, depending on the type of machine you are building, not less than 60 per cent., and it will go up as high as 75 per cent. in certain cases. We are giving you here averages which would be low in some cases, and in some cases might be a little high.

SENATOR WILLIAMS. It could not go to 75 per cent., could it, if 27.2 per cent. was the material?

Mr. GEIER. In those cases the material would be less. I could find you machines where the labor item would probably be 90 per cent. of the cost of the machine. For instance, my own business is somewhat of that last type. In our own case our direct labor is 48.8 per cent., the overhead labor, including such supplies as are properly chargeable to the labor item, 22.8 per cent.; and the material figures 28.4 per cent.

SENATOR HEYBURN. Of course, you have not made these figures based upon any particular operation, but upon all these mills as a general aggregate, a composite proposition?

Mr. GEIER. Yes. Please remember, gentlemen, that we only had a very short time to prepare our case. I may say to you that we have worked diligently and earnestly to get at the facts. We do not want to present anything here that does not bear the closest investigation and scrutiny. We simply want to show you such a situation that, I am sure, after you understand it, you will be full of sympathy for us in our case. We state here now that the material is 27.2 per cent., and we make the claim that the new Underwood bill would not permit us in any way to buy any of our material any cheaper than we are paying for it to-day. Even if we could buy cheaper, the part that material plays in the cost of our product is less, you see, than 28 per cent.

SENATOR SIMMONS. What is your raw material?

Mr. GEIER. The raw material is pig iron and bar steel. Those are the two basic things.

SENATOR SIMMONS. The Underwood bill reduces the duty on pig iron, and would not that reduce the price?

Mr. GEIER. The Underwood bill reduces the duty, but does not in this instance for us reduce the price. I have here in my hand a letter from *The Iron Age*, in answer to an inquiry from us to find out immediately the ruling prices on these basic materials in England and Germany as contrasted to the ruling prices in America today that enter into this product.

SENATOR SIMMONS. How do you know that the reduction made in the Underwood bill, so-called, of the duty on pig iron, is not going to reduce the price of pig iron?

Mr. GEIER. That is a matter of computation.

SENATOR McCUMBER. Assuming you would get your pig iron the cheaper in an amount measured by a reduction in the tariff, have you made an estimate as to what percentage that would bear to the selling price of your article? In other words, what percentage the reduction on pig iron would bear in influencing your selling price of your article?

Mr. GEIER. I have not figured it, but I think it would take several decimal points to express the result.

SENATOR McCUMBER. It is so infinitesimal that you could not take it into consideration at all, scarcely? Mr. GEIER. No.

SENATOR McCUMBER. And especially you could get no particular benefit upon the mere reduction in the raw material?

Mr. GEIER. No, it would not amount to anything worth while.

SENATOR CLARK. What was the effect of the statement first made, that the duty is still high on the raw material and lower on your product? What figure would that cut? If the tariff on the raw material makes no difference, what figure would that cut?

Mr. GEIER. The articles that enter into our product are protected in the Underwood bill all the way from 10 to 25

per cent.; whereas the finished article is put on the free list. The foreigner would get such supplies as ball bearings, for instance, 25 per cent. cheaper than we can, because the rate of duty is 25 per cent. in the Underwood bill if brought from abroad. A great many million dollars' worth of those ball bearings are coming into this country now. We have gone into a tabulation of the rates of wages paid by these 67 industries, and have also contrasted them with the information as to the ruling rates abroad on the same classes.

SENATOR WILLIAMS. Whence did you get those figures?

MR. GEIER. I will be glad to state. The German wage rates we have obtained from Captain Carden's reports. Captain Carden is the Government expert sent out by the United States for two years to study the conditions of the machine tool industry abroad. On page 16 of the report he gives the wages of Ludwig Loewe & Co.: Lathe hands, 15.8 cents per hour; plane hands, 16.8 cents; milling machine hands, 17.2 cents; boring mill, 17 cents. The average is 16.7 cents. That is a machine tool building concern, and therefore is very pertinent to our inquiry. His report also gives an average of the Reinecker, Schubert & Salzer, Pittler and De Fries shops, the figures for the latter being: Lathe hands, 15.6 cents; plane hands, 16.8 cents; milling machine hands, 16.8 cents; boring mill, 16.8 cents; an average of 16.5 cents. They also make machine tools. Then comes a concern in Saxony, the International Steam Pump Company. We got these figures directly from the company here. They have a plant in that district, and the wages they are paying are as follows: Lathe hands, 15.3 cents; boring mill, 15.6 cents; drill hands, 15.6 cents; or an average of 15.9 cents. Then Mr. Luchars, the editor of Machinery, made a compilation in 1908 of wages in Europe paid to machinists in Munich, Saxony, Berlin, and Magdeburg, and he gives, as the result of his tabulation, 15 cents per hour for the average rate of wages paid to the machine operators.

SENATOR WILLIAMS. Are those all figures of machine tools?

MR. GEIER. All but the last one named. But they use the same type of help as we do in the manufacture of our machines.

SENATOR WILLIAMS. I thought machine tool makers were a very high type, very skilled laborers.

MR. GEIER. So they are. If a man operates a boring mill in a pump works he has to be just as skilled as a man on a steam machine in a machine tool shop. That gives us an average of 14¾ cents for those classes of labor, skilled labor, machine operators. As opposed to that the reports of our 67 concerns show an average rate of 27.9 cents for machine operators.

SENATOR HEYBURN. Make it plain in the record that you are comparing the domestic with the foreign.

MR. GEIER. The average abroad for machine operators is 14¾ cents; the average here of our 67 machine tool concerns is 67.2 per cent. We have here vise hands and assemblers, who are men who do not work on machines but work on vises and fit parts together. We have on page 18 of Captain Carden's report, Ludwig Loewe & Co., of Berlin, machine tool builders, 14.4 cents; De Fries & Co., Duesseldorf, machine tool builders, 16.8 cents. Averaging those two we get 15.6 cents per hour for vise hands and assemblers in Germany. Our rate in this country, gathered in the same way, is averaged at 29.7 cents. Now we come to the unskilled labor. We have again Carden's report for Ludwig Loewe & Co., Berlin, 10.8 cents; De Fries, Duesseldorf, 9 cents. Then here we have a statement from Consul-General A. M. Thackara at Berlin: "According to a report published by the statistical office of the city of Duesseldorf, which appeared recently in the Imperial Official Journal, the average daily wages paid unskilled adult male laborers during the year 1910 in the following cities, each having a present population of 200,000 or more, as compared with the average wages paid during the year 1893, were as follows." He begins with Munich. A great many cities are given. So you get a good average. In 1893 the average was 56.9 cents per day, and in 1910 it had risen to 77.4 cents a day.

SENATOR CLARK. That had not special reference to men employed in your industry; it is general unskilled labor?

MR. GEIER. Yes, sir. Those are the men we have around the plant for doing the "toting."

SENATOR HEYBURN. Just give the figures of the unskilled labor abroad and here.

MR. GEIER. The average abroad for unskilled labor is 10.1 cents per hour; the average for unskilled labor in this country is 19.9 cents per hour.

SENATOR SIMMONS. Does that mean factory labor?

MR. GEIER. It means unskilled labor that we employ in our factories.

SENATOR SIMMONS. Unskilled labor employed in all the mills in this country?

MR. GEIER. No, the 67 concerns represented by these reports. Gentlemen, the first cost does not necessarily mean that that is a real saving in labor. You might have a low prime cost of labor, and yet a high cost of production. So we feel we must show to you, or bring facts before you to indicate, that that German labor is also efficient; that it not only costs less but also has a high efficiency.

SENATOR HEYBURN. Higher efficiency than our labor?

MR. GEIER. I am not saying that. I am saying that it has efficiency probably equal to that of our own country. I want to submit that Germany, through its scientific system of industrial education, going over the past 25 years, and with the equipment of machinery and organization of its manufacturing processes, is using its labor as efficiently as is possible in this country. It is admitted by thinking persons in this country that proper and efficient industrial education for our youth is one of the greatest national problems of the day.

Other nations, notably Germany, have pointed out the way we must follow. Gentlemen, I want you to bear with me on this thing, not so much on account of the fact that I am a machine tool maker, but because I am personally very much interested in this great subject of industrial education, and I hope the time is near when the United States Government will really take hold of this subject, which, to my mind, is one of the great problems of the present day, looking forward to the development of our industrial life. The little kingdom of Prussia, with approximately one-third of the population of the United States and one-thirtieth its area, had 400,000 young people between the ages of 14 and 18 attending schools for industrial training during the year 1908. This is equal to 13½ per cent. of the total population. Compare this with the record of the United States Bureau of Education for 1906, which shows that 1¾ per cent. of our population received vocational school education between the ages of 12 and 22 years, and we have the explanation for the more rapid increase of Prussia in export of manufactured goods, notwithstanding our marvelous growth in population and territory occupied. "The millions in imported manufactured products which would bear the label 'made in the United States' instead of 'made in Germany' or 'made in France' is mute testimony to our inefficiency," is the comment of M. R. Kultchar, a Chicago manufacturer, interested in industrial education. I could give you a great many quotations along those same lines. Prof. Hugo Munsterberg, in the last number of the North American Review, in an article entitled "Germany of To-day," calls attention to the tremendous impetus in the development of industrial life in Germany which the systematic education and technical education they have over there have given to that country.

THE CHAIRMAN. Mr. Geier, I do not suppose you are nearly through, and it will be necessary for us to take an adjournment until to-morrow at 10 o'clock.

Following is a list of the machine tool companies represented in person at the hearing:

Lodge & Shipley Machine Tool Company, Murray Shipley.
U. S. Electrical Tool Company, G. H. Feltes.
Bradford Machine Tool Company, Geo. T. Stewart.
Woodward & Powell Planer Company, E. M. Woodward.
Henry & Wright Mfg. Company, D. M. Wright.
American Tool Works Company, J. B. Doan.
Bullard Machine Tool Company, E. P. Bullard, Jr.
Whitcomb Machine Tool Company, Chas. E. Hildreth.
Prentice Bros. Company, A. E. Newton.
Cincinnati Milling Machine Company, Fred. A. Geier and C. Wood Walter.
Hendey Machine Company, C. H. Alvord.
American Machine Tool Company, M. H. Barker.
Gould & Eberhardt, F. L. Eberhardt.
Brown & Sharpe Mfg. Company, Henry Sharpe.
R. K. Le Blond Machine Tool Company, F. E. Le Blond.
Hillis & Jones Company, R. W. Smith.

J. Morton Poole Company, H. B. Haggard.
 T. C. Dill Machine Company, T. C. Dill.
 Heald Machine Company, James N. Heald.
 Detrick & Harvey Machine Company, J. S. Detrick and A. Harvey.
 Wm. Sellers & Co., Inc., J. H. Schwacke.
 Taylor & Fenn Company, Charles L. Taylor.
 Windsor Machine Company, D. W. Patten.
 Massillon Foundry & Machine Company, F. G. Harrison.
 Cincinnati Bickford Tool Company, G. P. Gradolf.
 W. F. & John Barnes Company, A. T. Barnes.
 Diamond Machine Company, H. S. Chafce.
 Niles-Bement-Pond Company, R. C. McKinney.
 Pratt & Whitney Company, W. L. Clark.
 Seneca Falls Mfg. Company, P. B. Kendig.
 H. B. Underwood & Co., M. G. Condon.
 Cincinnati Shaper Company and Cincinnati Gear Cutting Machine Company, P. G. March.
 Greaves, Kinsman & Co., William Greaves.
 King Machine Tool Company, E. M. Muller.

International Safety Congress

The new American idea of the safety engineer, an accident prevention specialist, will be brought to the notice of world industrialists at an International Safety Congress to be held in Milan, Italy, for five days, beginning May 27, 1912. This congress, the first of its kind of international scope ever held, will be for the purpose of setting in motion a worldwide movement for the conservation of human life in industry.

The American Museum of Safety, 29 West Thirty-ninth street, New York, is making preparations so that the United States will be well represented. An American national committee has been selected by the museum to co-operate with the international body and to promote the American ideas and views at the congress. Dr. W. H. Tolman, director of the museum, and other members of the committee will attend the congress.

The following are some of the papers which will be read at Milan: "The Safety Engineer on a Large Transportation System," by Dr. W. H. Tolman, chairman American committee; "How the New York Edison Safeguards the Lives and Limbs of Its Employees," by Arthur Williams; "The Work of the Safety Committee of the United States Steel Corporation"; "Safeguarding the Traveling Public and Protecting the Employees of the Electric Street Railway Association"; "Proper Illumination and Accident Prevention," by J. V. Lansingh, president Illuminating Engineering Society.

Association of Sheet and Tin Plate Manufacturers.—

Headquarters have been opened by this association in room 802, Frick Building, Pittsburgh. Directors have been elected as follows: W. S. Horner, district manager at Pittsburgh, of the American Rolling Mill Company, Middletown, Ohio; R. D. Campbell, treasurer Allegheny Steel Company, Brackenridge, Pa.; W. A. Thomas, president Brier Hill Steel Company, Youngstown, Ohio; Joseph B. Andrews, Newport Rolling Mill Company, Newport, Ky.; George W. Neidringhaus, second vice-president National Enameling & Stamping Company, St. Louis, Mo.; J. E. Carnahan, president Carnahan Tin Plate & Sheet Company, Canton, Ohio. W. S. Horner has been made president; W. A. Thomas, vice-president, and R. D. Campbell, treasurer.

The Western Steel Car & Foundry Company, Burnham, Ill., which has been operating the plant of the Illinois Car & Equipment Company since 1902 under a lease, has exercised an option providing for the purchase of the property. The consideration was \$1,100,000. The Western Steel Car & Foundry Company is the Western subsidiary of the Pressed Steel Car Company.

The extension of the shop of the Terry Steam Turbine Company at Hartford, Conn., is now completed, and the equipment has been installed. With the former plant 1000 Terry steam turbines have been built on order and are in operation. With the additional space the output can now be increased 100 per cent. The company announces that orders on hand are larger than ever before in its history.

Rapid Bridge Replacement

Three 200-Ft. Double-Track Spans of the Baltimore & Ohio on a Skew Moved Into Place in Record Time

When the Baltimore & Ohio Railroad Company decided to replace the three single track pin-connected spans over the Monongahela River, on the Wheeling division, near Fairmont, W. Va., with double-track riveted truss spans, it was confronted with the problem of erecting the new work in the face of an enormous traffic without hindrance or delay thereto. The masonry on which the old spans were erected in 1886 was built to accommodate a double-track bridge, though the bridge then erected was the common single track pin-connected type.

The contract, as let to the American Bridge Company of New York, provided that the new work should be erected parallel to the old bridge, one line of trusses resting on the masonry, the other resting on temporary pile extensions to the masonry. On completing the new work traffic was to be diverted from the old to the new spans, pending the removal of the old structure and pulling the new work into its permanent position, the entire operation to be executed without interference to traffic.

The new work consisted of three through riveted truss spans, each 203 ft. 5 in. center to center of the end bearings, on a 21-ft. 6-in. skew. The three spans, with floor, rail and engines used for the movement weigh approximately 2200 tons. After the removal of the old structure the masonry was cut down 12 ft. and capped with heavier stone, at the same time raising the track 2 ft. above its former elevation.

For moving the new work from its temporary to its permanent position, a distance of 26 ft. 6 in., seven lines of 90-lb. rails were laid on the masonry and masonry extensions and on these were placed 2¼-in. rollers, spaced 12 in., and held in place by guide plates. Another line of seven rails was laid above the rollers and on these upper rails the bridge shoes rested. The bottom layer of rails extended over the masonry in the direction of the movement of the bridge, and they were clamped at the ends with 8 x 16 timbers for attaching the tackle. The rails were also fox-bolted to the masonry to resist spreading and upward movement.

On the abutments 14 parts of 1½-in. manila rope were used and on the two piers 24 parts, or 12 parts to each span on the piers. It was desired (and this the rigging permitted) that the extreme ends of the structure should travel a trifle slower than the movement at the piers and eliminate the danger of "locking" the spans by the extreme ends getting ahead. In the rigging used all ends of lines led to the engines instead of any ends terminating at becketts, which arrangement doubled the speed of the movement.

Track was broken on the afternoon of January 24 and what is emphasized as the most extensive and complicated (on account of the skew) undertaking of its kind on record was successfully accomplished in 3 minutes. One hour and fifteen minutes were consumed in breaking and shifting the track, moving the new spans into their permanent position and connecting the track for traffic. After the spans were moved into permanent position they were jacked up, the rails and rollers removed and masonry plates and segmental rollers placed in their permanent positions. Several of the Baltimore & Ohio engineers, as well as engineers from different parts of the country, were present to witness the unusual undertaking.

The Louisville Railway Company, Louisville, Ky., has placed an order for 3000 steel ties with the Carnegie Steel Company and will utilize them on an extension of a suburban line. The order is largely in the nature of an experiment, and if they are satisfactory steel ties will be substituted entirely for wooden ones.

The Cambria Steel Company reports for the year ended December 31 net income of \$2,777,338, as compared with \$4,553,332 in 1910.

The Machinery Markets

Rather quiet conditions prevail in most machinery markets and the business with few exceptions has been confined to single tool purchases. Much interest is being taken in the tariff question, and tool builders are hoping that the proposed schedule will not go into effect. New York and New England dealers see in the sources of inquiry good business for the coming spring, although current sales are not as good as those of January. Cincinnati dealers have been bidding on a \$100,000 list from a local manufacturer. Conditions are improving in Cleveland, but orders for round lots of tools are slow in coming out. Chicago reports current inquiry as light, but a good business is being done in second-hand equipment. The South is occupied with the prospects for business from the schools where the manual training movement is being developed. Irrigation developments are creating an unusual demand for pumping machinery in Texas and the Southwest and the call for all classes of machinery is increasing. Renewed political troubles in Mexico have had a depressing effect on trade which had started up there. Reports from other selling centers are of an encouraging nature as to prospects for the near future.

New York

NEW YORK, February 14, 1912.

While there has been some little subsidence of business and fewer inquiries have come out, those already before the trade promise to close soon and prospects for the coming spring have a better tone than for some time past. Current business, such as there is, comes from widely scattered sources and includes some equipment for Canadian interests. Manufacturers' agents who handle a line of special and automatic machinery are enjoying a fair trade, and there is enough business in sight to make them hopeful. The railroad buying as well as inquiry is confined to single tools for replacement and is not a factor. There has been an immense amount of discussion the past week about the proposed new tariff schedule and particularly of the question as to just what constitutes a "machine tool," a question which is vitally involved.

The American Cotton Oil Company, 27 Beaver street, New York, is preparing plans for a new oil refinery plant to be erected on property recently acquired in Bayonne, N. J. Tentative plans call for three buildings, one four stories, 100 x 200 ft., and two buildings, 75 x 125 ft., three stories, all to be reinforced concrete and steel-throughout. The plant with its equipment, which will be of a special nature, will cost about \$500,000.

The Lackawanna Bridge Company, Buffalo, N. Y., has received a general contract for the construction of a car shop building for the New York Central Railroad Company at West Albany, to cost \$100,000.

The Frontier Tire & Rubber Company, Buffalo, has been incorporated with a capital stock of \$250,000 to take over the business and plant of the Frontier Rubber Company at 1400 to 1414 Niagara street. Additional rubber making machinery will be installed at once in the present plant, and an option has been secured on some large manufacturing buildings which will be fitted up for automobile tire making and fully equipped with the latest type of rubber machinery, washing and grinding machines, drying apparatus, rolls calenders, presses, molds and vulcanizers. Charles F. Benzing is president and general manager.

The Snyder Mfg. Company, Little Falls, N. Y., maker of bicycles, knitting machinery, etc., will build an addition 60 x 80 ft., two stories, to its plant on Main street, that city.

The Enterprise Garnetting Company, Albany, N. Y., has been incorporated with a capital stock of \$75,000 to manufacture cotton and wool waste, etc. F. B. Graves and G. C. Angus, Albany, and J. F. Kearney, Cohoes, are the incorporators.

Faul & Timmons, Buffalo, N. Y., have recently established at 286-288 Ellicott street, a factory for the manufacture of steel hand-hole gaskets for water tube boilers, for which they are having a large demand.

The West Rotary Engine Company, Monticello, N. Y., has been incorporated with a capital stock of \$500,000 to manufacture engines, machinery, etc. The directors are Augustus A. West, 494 Marion street, Brooklyn; Morris Meyers, New York City, and Baird L. Short, Collingwood, N. J.

The Gilbert Knitting Company, Little Falls, N. Y., has plans under way for two additional buildings to be erected at its plant on Main street, respectively 100 x 100 ft., four stories and basement and 78 x 138 ft., two stories, of brick, mill construction.

The Little Falls Felt Shoe Company, Little Falls, N. Y., will build a two-story addition 43 x 78 ft. to its factory at Sixth and John streets.

The John M. Forster Company, Rochester, N. Y., with a capital stock of \$25,000, has been incorporated to manufacture machinery and machine tools. F. J. Forster and H. M. Kriss, Rochester, and M. H. Forster, Fairport, N. Y., are the incorporators.

The Fulton Machine & Vise Company, Lowville, N. Y., is completing plans for a one-story foundry addition to be made to its plant this spring.

The city of Allentown, Pa., has grown to such an extent that it is compelled to enlarge its water supply. The data necessary in this matter are now being gathered for presentation to the water committee on or before March 15. The specifications call for one 12,000,000 gal. pumping engine to be installed at the city pumping station, the foundations to be constructed by the city. A bond issue will be made to cover the cost.

The Niagara Metal Weather Strip Company, Niagara Falls, N. Y., has been incorporated with a capital stock of \$20,000 to manufacture weather strips. The company is arranging for a plant. The directors are F. H. Palmer, 45 Manchester place, Buffalo, and F. S. and C. H. Franklin, Hamburg, N. Y.

New England

BOSTON, MASS., February 13, 1912.

The prevailing feeling in the trade is that, while business is not particularly good, indications of an increase in orders are to be found. It is particularly noteworthy that inquiries which promise early transformation into purchases are from an increasing diversity of interests, instead of being confined in a large degree to the automobile trade and foreign customers. Builders of machine tools are making fewer complaints as to actual sales and as to the outlook.

C. K. Lassiter, mechanical superintendent of the American Locomotive Company, has purchased a controlling interest in the Bausch Machine Tool Company, Springfield, Mass., from Frank H. Page, president of the National Equipment Company of that city. Mr. Lassiter will not undertake the active management of the business, but will be president of the corporation. Walter H. Faulkner will be the treasurer, J. A. Eden, Jr., manager, and C. A. Smith, superintendent. C. J. Wetsel retires as manager after several successful years in charge of the business. Mr. Page retains an interest and will be represented in the board of directors. The capital stock will be increased from \$150,000 to \$1,500,000, of which \$500,000 will be 6 per cent. cumulative preferred, and \$1,000,000 common. The reason for the new capital lies in the contemplated increase of the business. The company manufactures as a standard line multiple spindle drilling machines, and does work for outside parties, notably the National Equipment Company. To this will be added the manufacture of hydro-pneumatic drills, bolt turning machinery and stay-bolt threading machines, designed and patented by Mr. Lassiter. Interests associated with the Union Twist Drill Company, Athol, Mass., are financially concerned in the reorganized company. The company plans to increase its plant.

The Boston & Maine Railroad is placing the contract for the structural steel which will go into the great locomotive and car repair shops at North Billerica, Mass., which assures the carrying out of the plans this season, as was expected. Railroad men having a knowledge of conditions on the New Haven Road property.

the erection of a very large repair plant for the western end of the system, to be erected in New Haven, Conn., or the immediate neighborhood. Whether this project will be carried through this season is doubtful, yet it is believed quite possible that the initial steps will be taken before the end of the year. It is considered almost certain that the Grand Trunk interests will have to establish repair shops at the Providence end of the extension of the Vermont Central Railroad from Palmer, Mass., or at Palmer, because repair facilities within convenient access of the new line are now lacking.

The S. A. Woods Machine Company, Boston, Mass., builder of wood-working planers, is preparing plans for the construction of a large erecting shop on land adjacent to its works at South Boston. The building will be 70 x 250 ft., one-story. The floor will be served by a 10-ton traveling crane, which will operate in conjunction with auxiliary cranes.

Lancaster P. Clark has been made secretary of the Blake & Johnson Company, Waterbury, Conn. John P. Elton remains as president, and Robert P. Lewis as treasurer. Mr. Clark will continue as manager of the machinery division of the business.

The General Electric Company announces that it will erect several large buildings this year at its works at Pittsfield, Mass. One will be used as a machine shop and store house, and will be 125 x 375 ft. Another factory building will contain 100,000 sq. ft. of floor space, and building No. 26 will be extended. The estimated cost of these improvements is \$250,000.

The Connecticut Computing Machine Company, New Haven, Conn., has been placed in the hands of the Union & New Haven Trust Company, as temporary receiver, and steps will be taken at once to wind up the company's affairs and dissolve the corporation. The action was taken following a vote of the directors to discontinue the business. A large amount of money has been expended in developing a computing machine which is now said to be commercially practical, but the incorporators of the company do not care to put any more money into the enterprise.

The business of the P. H. P. Motor Truck Company, Westfield, Mass., has been purchased by W. S. Magill, Guy Osborne and I. P. Miller, New York, who will continue it as the Westfield Motor Truck Company. The present factory building will be altered that the business may be carried along on a larger scale. It is planned to build 300 trucks this season. The capital stock will be increased to \$150,000, of which \$50,000 will be preferred and \$100,000 common.

The Dart Mfg. Company, Waterloo, Iowa, manufacturer of light auto delivery trucks, is contemplating establishing an Eastern plant, and Worcester, Mass., is being considered as the site. The company has stipulated that this city will be chosen if \$200,000 capital is raised here.

The furniture factory of the French & Heald Company, Milford, N. H., was burned recently with a loss of \$100,000.

The Grace Machinery Company is incorporating to manufacture a combined shear and punching machine which is the invention of John W. Grace, Burlington, Vt.

The Waterville Corporation has begun the erection of an additional factory building at Waterville, Conn., 100 x 300 ft., one story.

The Stamford Foundry Company, Stamford, Conn., has increased its capital stock from \$40,000 to \$75,000.

The Bridgeport Brass Company, Bridgeport, Conn., has increased its capital stock from \$1,000,000 to \$1,100,000.

The American Silver Company, Bristol, Conn., will erect a factory building at Main and Pearl streets, 30 x 50 ft., two stories.

Additions to general manufacturing works in New England just announced include the following: West Boylston Mfg. Company, Easthampton, Mass., mill 124 x 456 ft., four stories, stockhouse 100 x 180 ft., seven stories, and an additional story 122 x 400 ft. to an existing building, all of mill construction with steel beams; Birdseye-Somers Company, Bridgeport, Conn., corset manufacturer, a complete new plant on a tract of land just purchased; the Bias Narrow Fabric Company, Bridgeport, Conn., factory to contain 25,000 sq. ft. of manufacturing space; the Boone Folding Box & Printing Company, New Haven, Conn., additional building.

The Board of Trade of Norwich, Conn., has raised the \$75,000 in capital for the American Thermos Bottle Company, which fulfills the condition upon which depended the removal of the company's factory from New York City to Norwich. A factory will be built.

The Star Pin Company, Shelton, Conn., will erect a new building 24 x 111 ft., two stories.

Cleveland

CLEVELAND, OHIO, February 13, 1912.

Local machine tool dealers are getting a somewhat better volume of inquiries but orders for round lots of tools are slow in coming out. New inquiries during the week include one for four large machines, aggregating about \$15,000 and another for about 15 small and medium sized tools amounting to about \$10,000. A moderate volume of business was placed during the week in single tools and small lots, orders in the aggregate showing a little improvement over the previous week. There is a fair demand for second-hand machinery.

Some of the local machine tool builders notice a little improvement in orders. A local maker of electric drills and reamers reports considerable improvement in its business. Sales agents for motors and generators are getting a fair volume of orders. A good volume of business is in prospect for equipment for extensions to municipal water works and electric light plants in Ohio during the next few months.

The Peerless Gear Tester Mfg. Company, Cleveland, Ohio, which was recently organized, has established offices at 632 Schofield Building. The company expects shortly to establish a plant for the manufacture of gear testers. The officers are J. D. Chambers, president and treasurer; R. L. Swartz, vice-president; Worthington Hoyt, secretary.

The Ohio Blower Company, Cleveland, Ohio, will shortly begin the erection of a new plant on Ivanhoe Road, East Cleveland. The plant will be two stories and basement, of re-inforced concrete construction. There will be a main building 60 x 140 ft. and a wing 70 x 70 ft. and a two-story office building 40 x 50 ft. An electric elevator will be installed. Power for operating the plant will be furnished by a commercial company. Plans have been prepared by the Moore Engineering Company, New England Building, Cleveland.

Purchases will shortly be made for the new plant of the Peck, Stow & Wilcox Company at Southington, Conn., including 60 oil furnaces for case hardening and annealing. This order will be placed by Anton Burckard, engineer, Cuyahoga Building, Cleveland, Ohio.

The Cleveland office of the Ingersoll-Rand Company, has just received from the Cleveland Construction Company an order for one large steam-air compressor and one large electric-air compressor for the plant of the Fort Worth Light & Power Company, Fort Worth, Tex. Orders for the electrical equipment for this plant were placed some time ago with the General Electric Company.

The Aultman-Taylor Machinery Company, Mansfield, Ohio, is in the market for a chucking lathe milling machine and radial drill for its gas engine department.

The Union Boiler Works Company, Toledo, Ohio, which was recently incorporated with a capital stock of \$100,000, has leased the building formerly occupied by the Globe Boiler Works, 515 Water street. The company has had a contract with a Detroit concern for the manufacture of special machinery for power plants. In addition it will operate a boiler repair department. It plans to erect a new plant next year.

The Ullman-Philpott Company, Cleveland, Ohio, maker of paints and varnishes, will build a new plant on Lexington avenue. The building will be 40 x 130 ft., of brick and re-inforced concrete and three stories and basement. Plans are being prepared by Wilber J. Watson, engineer.

At a recent meeting of the stockholders of the Louth-Juergens Motor Car Company, Fremont, Ohio, it was decided to increase its capital stock and to erect an addition to its plant. The company will also erect a branch factory at Gibsonburg, Ohio.

Columbus, Ohio, will hold a special election May 21 to vote on the question of issuing \$265,000 in bonds for the purpose of extending and enlarging of the municipal lighting plant.

The Dunlap Mfg. Company, Columbus, Ohio, has been organized by interests associated with the Dunlap Engineering Company to make machinery on contract. The company has a well-equipped plant at 1432 Parsons street. T. C. Dunlap is president.

The Toledo Factories Company, Toledo, Ohio, has awarded a contract to A. Bentley & Sons Company for the erection of the initial units of a power plant building in that city. Two wings will be erected having a floor space of 156,000 sq. ft. The building will be four stories of steel and concrete construction. It is designed to furnish quarters for small manufacturing concerns.

The Willys-Overland Company, Toledo, Ohio, will

build a transformer building 40x60 ft. Plans have been prepared by Geo. S. Mills, architect.

Mansfield, Ohio, has had plans prepared for the erection of a municipal lighting plant.

Henry Segraves has been in Cleveland during the past few days buying equipment for a new machine shop and foundry that he is building in Pikesville, Ky. Some addition machine, tool and foundry equipment are to be purchased.

Guy M. Babst, Crestline, Ohio, will establish a plant in Kansas City, Mo., for the manufacture of aluminum kitchenware. Some machinery will be required.

Toledo, Ohio, has authorized the issue of \$150,000 in bonds for the purpose of extending and enlarging its water-works plant.

Bryan, Ohio, will issue \$17,000 in bonds to enlarge and install new power machinery in the municipal water works and electric light plant.

Cincinnati

CINCINNATI, OHIO, February 13, 1912.

A local manufacturing company is understood to have purchased on an extensive list of tools to the value of nearly \$100,000, and this is about the only happening of interest to be recorded. Both the general export and domestic business in machine tools seems to have struck another quiet week, and the inquiries out are not numerous enough to justify hoping for an immediate change for the better.

The tariff question continues to be a very absorbing topic for discussion, and tool builders in this section are earnestly hoping that the existing duty will not be tampered with.

At noon, February 10, Congressman William C. Redfield, of New York, delivered an intensely interesting address to about 700 members of the Cincinnati Business Men's Club. The address dealt mainly with the importance of the export trade, and the necessity of reducing manufacturing costs to compete with England and Germany. It is the intention of Civic Secretary J. M. Manley to obtain a speaker, at least once a month, to deliver an address at the Saturday lunch hour.

The Hess Spring & Axle Company, Carthage, Ohio, a Cincinnati suburb, has broken ground for the large addition to its new factory, recently mentioned as contemplated. The J. R. Stevens Company, Odd Fellows Temple, Cincinnati, is the contractor in charge of the work. It is understood that the Hess Company is purchasing on a machine tool list that will require an expenditure of nearly \$100,000. As previously stated, the new factory will be used for manufacturing a patented automobile and auto truck axle.

The Newport Rolling Mill Company, Newport, Ky., manufacturer of genuine open hearth iron sheets, has under construction a new boiler-house that will be 200 x 250 ft., one-story. Additional mill equipment will also be installed. The McClintic-Marshall Construction Company, Pittsburgh, is the contractor in charge of the work.

Plans have been completed, but not yet approved, for additions to the shops of the Queen & Crescent Railroad Company at both Ludlow and Somerset, Ky. If these extensions are made some extra machine tool equipment will have to be provided.

The Cincinnati office of the Vanadium Alloys Steel Company, of which C. M. Bigger is manager, has been removed to more commodious quarters at 507 Mercantile Library Building.

The Cincinnati Gas, Coke, Coal & Mining Company has changed its name to the Reliance Coal & Coke Company.

The plant of the Lawrenceburg Electric Light Company, Lawrenceburg, Ind., has been acquired by the city, and it is rumored that some extensive improvements will be made at an early date.

The Metal Flanged Concrete Pipe Company, Mt. Gilead, Ohio, has been incorporated with \$15,000 capital stock. T. B. Mateer and E. L. Masters are named among the incorporators.

The French Oil Mill Machinery Company, Piqua, Ohio, will erect a two-story building that will be used for an office only and not for manufacturing purposes, as has been currently reported.

The Siegman Construction Company, Cincinnati, has been incorporated under the laws of West Virginia, with \$50,000 capital stock, to do a general construction business. J. J. Siegman is one of the principal incorporators.

The Eagle White Lead Company, Cincinnati, whose plant was recently damaged by fire, has commissioned

the M. Marcus Building Company, Cincinnati, to make the necessary repairs, and announces that no delays in shipments will be experienced. The damage sustained was nearly \$100,000, fully covered by insurance.

The Stewart Iron Works, Cincinnati, has opened a branch office at Louisville, Ky., that will be in charge of Harry G. Howell.

The plant of the Olive Foundry & Machine Shop, Ironton, Ohio, was almost completely destroyed by fire February 5. The loss is estimated at \$60,000.

Chicago

CHICAGO, February 13, 1912.

Following a month of very encouraging business in machine tools, inquiry and sales in February have relapsed into a condition of decided quiet. It develops that the large list of tools for which the Chicago & Alton Railroad asked quotations before the close of last year was quietly placed with one machine tool house on a lump sum proposition. As originally submitted, this inquiry is estimated to carry machines valued at over \$100,000. Current inquiry is very light and confined to requirements for one and two machines. A builder of boilers and engines at Burlington, Iowa, is in the market for two radial drills and a few machines are being figured upon through some of the local railroad offices. There is no immediate prospect of the Wabash Railroad purchasing machines although their ultimate purchase is assured. A fair inquiry for second-hand machines is noted.

The Bauer Construction Company, Chicago, has purchased a site 100 x 130 ft. at North Franklin and West Superior streets, upon which a factory will be erected.

The Illinois Cutlery Company, Blue Island, Ill., has increased its capital stock from \$10,000 to \$60,000 for the purpose of enlarging its plant and adding new mechanical equipment.

The Barnard & Lees Mfg. Company, Moline, Ill., suffered a very heavy loss in the destruction of its plant by fire February 6. The entire plant, with the exception of a foundry, was damaged, the loss being estimated at \$300,000. It is stated that the plant will be rebuilt.

The Hunt & Scheutz Hardware Company, Sioux City, Iowa, has let the contract for the erection of a new factory building of heavy mill construction, the cost of which will be \$20,000.

The Iowa Portland Cement Company, Des Moines, Iowa, is installing additional machinery and equipment in its plant, for which an expenditure of \$250,000 is involved.

The Peerless Cream Separator Company, Waterloo, Iowa, is rebuilding upon the site of its former plant destroyed by fire, new factory buildings which will be completed early in the spring. New machinery will be installed.

The George J. Meyers Mfg. Company, boilermaker, Milwaukee, Wis., has decided upon the erection of a new factory this spring.

The Motor Conveyance Company, Milwaukee, Wis., manufacturer of motor trucks, is contemplating the building of a new factory in that city and is now engaged in seeking a suitable site.

The Milwaukee School of Aviation, Milwaukee, Wis., has completed plans for the erection of a steel and concrete factory building, 50 x 200 ft. The plant will be equipped with machinery suitable for the manufacture of aerial craft.

The Aluminium Goods Mfg. Company, Manitowoc, Wis., has completed and is about to place in operation its new plant erected at a cost of \$200,000.

The Milwaukee Milling Machine Company, West Allis, Wis., has been incorporated with a capital stock of \$5000 by Edgar J. Kearney, Theodore Trecker and Mackey Wells. The organizers will be recognized as of the firm of Kearney & Trecker, builders of the well-known Milwaukee milling machine.

The Rock Island Bridge & Iron Works, Rock Island, Ill., has been incorporated with \$30,000 capital stock by M. H. Kanary, Edward Manhard and Walter G. Murphy, to do a general iron works and construction business.

The Nehring Insulated Wire & Mfg. Company, Sycamore, Ill., has been incorporated with \$30,000 capital stock by P. A. Nehring, James W. Cliffe, T. M. Cliffe and L. E. Peck, for the purpose of establishing and equipping a plant for the manufacture of wire, insulation, etc.

The Illinois Sheet Metal Company, Milford, Ill., has been incorporated with \$50,000 capital stock by J. A. Murielt, G. F. Patterson and T. C. Herron, and will

equip a plant with heavy machinery for the manufacture of sheet metal goods.

The Ingalls-Shepard Forging Company, Harvey, Ill., has increased its capital stock from \$120,000 to \$200,000 for the purpose of increasing its plant and mechanical equipment.

Detroit

DETROIT, MICH., February 13, 1912.

Reports from local machine tool merchants this week indicate that business is showing an improvement, and that the outlook is more favorable. Current sales show an increase, although single tool propositions for the most part, and general inquiry is more active. Sales to the automobile industry are beginning to be noted and while these are mostly for replacement purposes, they point the way for larger business in this direction in the near future. Builders of special machinery report an active demand, and a number of local plants are being operated at full capacity. Second-hand machinery is also more active, with a marked demand for wood-working machinery. The paper industry at Kalamazoo, Mich., is in a very flourishing condition—practically every plant is running to capacity and under continued favorable conditions—and a considerable amount of new equipment will probably be installed during the year. Foundries are doing a moderate business and are operating at about the same capacity as for several weeks past, although some gray iron plants are getting a better run of orders. Local fabricators of structural material are doing little, few large projects have been announced this year and a good deal of business has been placed outside the city.

The Motor Truck Body Company, Detroit, has been incorporated with a capital stock of \$10,000, by Elmer T. Hangsterfer, Fred G. Proctor and Edwin F. Rauss. The company will engage in the manufacture of automobile truck bodies and parts.

The White Star Refining Company, Detroit, has been organized with \$50,000 capital stock to manufacture soap and refine oil. Harry B. Earhart is the principal stockholder.

The Consolidated Light & Power Company, Detroit, has purchased the holdings of the R. J. Tower Electric Company and the Greenville Gas & Electric Company at Greenville, Mich. The new owner will rebuild the gas plant and probably make some improvements to the power plant.

Frederick Stearns & Company, manufacturers of drugs, will erect a one-story addition to their Detroit plant on Jefferson avenue and have also completed plans for a four-story addition, 48 x 120 ft., to their Windsor plant.

The Detroit Coil Company, Detroit, has been incorporated with a capital stock of \$500, to manufacture spark and ignition coils and other electrical appliances. The incorporators are C. C. and N. M. Cleverdon and H. E. Westerdale.

The Cement Block & Supply Company, Detroit, has been organized with \$25,000 capital stock to manufacture cement blocks and other building materials. The stockholders include Richie E. Teets, G. C. Musson and Sidney Alexander.

The American Steel Belt Company, recently organized at Pontiac, Mich., has secured a large factory at Hubbard and C streets, Detroit, where operations will be started within a short time. The company has a capital stock of \$100,000, and will manufacture steel belts.

The Murray Specialty Mfg. Company, Detroit, has been incorporated with a capital stock of \$50,000 to take over the business of the Murray Automatic Boiler Feed Company at 807 Scotten avenue. The scope of the company's business will be gradually extended and will include the manufacture of machinery and power plant equipment and the operation of a foundry and machine shop. The new officers of the company are F. F. and C. C. Wormer and C. J. O'Hara.

The Michigan Flax Company, Detroit, has been incorporated with \$30,000 capital stock to manufacture flax products. The incorporators are Herman A. Miller, Irving J. Coffin and David Reed.

A new company has been incorporated at Grand Rapids, Mich., by John Duffy, J. F. Campbell and Andrew Fyfe, for the manufacture of band instruments. The capital stock is \$30,000, and a factory will be equipped at once.

The City Council of Saginaw, Mich., has authorized the purchase of two new pumps for the east side pump-

ing station. The new pumps will have a daily capacity of 4,000,000 gal., and it is understood that bids will soon be asked for.

The Ramsey-Alton Company, Portland, Mich., is planning the erection of a new factory 60 x 100 ft. to cost about \$10,000. A condition is that adjacent property be deeded to the company by the village. The company manufactures furniture.

The Dayton Last Block Company, Gaylord, Mich., will erect a new dry house 40 x 200 ft.

The State Railroad Commission has granted permission to the Edison-Sault Electric Company, Sault Ste. Marie, Mich., to increase its capital stock by \$150,000. The new issue will be used in part for plant improvement and in the installation of additional water wheels, it is stated.

The Graff Seamless Shoe Company, maker of athletic shoes, will remove its plant from Attica, Ind., to Saginaw, Mich. The company has a capital stock of \$25,000 and will occupy leased quarters at the outset, but plans the erection of a factory in the near future. Andrew Graff is president.

The Battle Creek Table Mfg. Company, Battle Creek, Mich., has been incorporated with \$150,000 to take over the business of the old Battle Creek Table Company. Samuel Rosenfeld is president. There will be no enlargements of the plant at present.

Battle Creek, Mich., is considering the installation of a purification and filtration plant at Lake Gogiac, to cost about \$100,000. W. W. Bridgen is superintendent of the water board.

The Michigan Art Carving Company, Grand Rapids, Mich., is about to remove its business to Lake Odessa, Mich., where a new factory is being erected. The company is a maker of furniture.

The Commonwealth Power Company, Jackson, Mich., is planning to improve its electric light plant at Allegan, Mich., by the installation of a large amount of new equipment, including transformers, etc.

At the annual meeting of the Michigan Sugar Company, Detroit, held February 10, it was decided to double the capacity of the company's plant at Alma, Mich. The cost of the new buildings and equipment is estimated at \$250,000. The plans for the new plant at Pigeon, Mich., were also ratified and \$1,000,000 will be raised by the issue of additional stock or bonds for building the latter plant.

The E. P. Daggett Canning Company, Coopersville, Mich., with a capital stock of \$50,000, has begun the erection of a new canning factory, for which ground was broken early this month. The machinery equipment for the plant is yet to be purchased.

The Pere Marquette Railroad is contemplating the erection of a large round house at Ludington, Mich.

Wilcox Brothers, Cadillac, Mich., lumber manufacturers, have under consideration the erection of a brick saw mill in that city.

The American Steel Belt Company, Pontiac, Mich., recently incorporated, has increased its capital stock from \$50,000 to \$100,000.

The Cant-Slip Company, Freport, Mich., recently mentioned as having been incorporated to manufacture clamps, hand screws, etc., has had plans prepared for a two-story building, 30 x 40 ft., for which it will require complete machine-shop equipment and two 6-hp. kerosene engines.

Indianapolis

INDIANAPOLIS, IND., February 13, 1912.

The Tippecanoe River Electric Company, Indianapolis, has been incorporated with \$300,000 capital stock. The company plans to erect a power plant on the Tippecanoe River near Monticello, Ind. The directors are James W. Lilly, Alexander C. Ayres, Walter D. Jones, William W. Hammond and Frank C. Ayres, all of Indianapolis. The promoters say the plans will not be completed for some time.

The Home Elevator Company, Indianapolis, has been incorporated with \$5,000 capital stock to manufacture elevators and general machinery. The directors are J. W. Hobbs, A. Hoffman and H. J. Yount.

The Oakes Mfg. Company, Indianapolis, has been incorporated with \$10,000 capital stock to manufacture fans, machine parts and sundries and tools. The directors are W. D. Oakes, W. H. Oakes and C. P. Oakes.

The Smart Mfg. Company, Indianapolis, has been incorporated with \$10,000 capital stock to manufacture automobile accessories. The directors are Briney

Smart, L. B. Willis, J. N. Shelton, J. F. Cooper and George Williams.

John A. Rowe's stone mill at Bedford, Ind., was burned February 7 with \$50,000 loss, covered by \$20,000 insurance. The plant was operated by electricity.

The Cline Protective Signal System, an Arizona corporation with \$500,000 capital stock, will have its manufacturing plant in Indianapolis, Ind., the directors, Fred Cline, Ira P. Haymaker and Fred L. Pettijohn, living here. It will manufacture burglar alarms and other electrical devices. The company will have an office in Phoenix, Ariz.

The Great Lakes Cement Construction Company, East Chicago, Ind., has been incorporated with \$10,000 capital stock to do a general construction business. The directors are H. H. Hays, A. P. Meredith and E. J. Meredith.

C. R. Heath, Noblesville, Ind., has applied for a franchise for the erection of an artificial gas plant at Tip-ton, Ind.

The Madison Light & Fuel Company, Madison, Ind., has been incorporated with \$150,000 capital stock to furnish heat and light. The directors are E. F. Potter, W. C. Bevins and H. L. Hanley.

The Bennett-Barnes Company, Terre Haute, Ind., has been incorporated with \$10,000 capital stock to do a general construction business. The directors are C. Bennett, E. J. Bennett and G. L. Barnes.

The Citizens Electric Light & Power Company, Lebanon, Ind., has increased its capital stock \$100,000.

The Colfax Company, Colfax, Ind., has been incorporated with \$8,000 capital stock to supply heat, light and power. The directors are R. T. Sherley, J. E. Gary and J. M. Waugh.

The South

LOUISVILLE, KY., February 13, 1912.

Although sales have not been large in volume, and the general report made by manufacturers and dealers has been "nothing doing," the situation is by no means unsatisfactory. Most of the local plants are running full time and have sufficient orders ahead to carry them along for from 30 to 60 days. There is, as heretofore noted, considerable business in the market, and though this is not being closed up rapidly, the chances favor the placing of a lot of orders in the immediate future. Unusually severe weather, which has prevailed all over the South since the beginning of 1912, has had a retarding influence on business of all kinds, and has naturally hurt the machinery trade as well. The breaking up of the cold weather will have a beneficial effect.

Comment has been made heretofore on the big market for machine tools, wood-working machinery, etc., which is offered by the development of manual and industrial training in the South. Emphasis may be laid upon this again, as a number of inquiries of this kind have developed during the past week, and the prospects are that Southern cities which have not provided such courses in their schools will do so in the near future.

An interesting indication received by manufacturers of stone-quarrying equipment is that this business is being developed in the Northwest, including Washington and British Columbia. A number of big inquiries have been received from that section, together with some orders, and reports are that the stone producing trade in that section is to be developed.

The Norman Lumber & Box Company, Louisville, is rearranging its box factory and will require the installation of about twenty electric motors.

The O. K. Stove & Range Company, Louisville, is planning to install some new equipment, chiefly electrical. The machinery will probably all be electrically operated hereafter.

The Pneumatic Jack Company, Louisville, has begun business. It is offering a patented jack used in railroad work. Sales have recently been made to the Tennessee Central and the Louisville, Henderson & St. Louis railroads. J. S. Leake, manager of the company, has offices in the Paul Jones Building. The tool is being manufactured by contract at present, but the company expects to establish its own factory later on.

The New Idea Company, Louisville, is being organized for the purpose of manufacturing flour-milling machinery.

The Brandeis Machinery & Supply Company, Louisville, has sold a large order of Houston, Stanwood & Gamble engines and boilers, aggregating about 500 hp. of each, to the Ohio River Contract Company, Evans-

ville, Ind., for use in the work of building Government locks on the Ohio River at Henderson, Ky.

The Henry Vogt Machine Company, Louisville, reports business fairly quiet, but enough contracts in hand to keep the plant running full time for a considerable period.

C. J. Walton & Son, Louisville, report a good demand for boilers. Not many inquiries have been received during the past week or two, but the plant has been working full time and has enough business ahead to keep it running for 60 days.

The New Albany Mfg. Company, New Albany, Ind., reports the demand for quarrying equipment fair, although no special activity has been noted. The outlook for spring in the building trade is good, so that the stone quarries will have an active season.

The Ashland Leather Company, Ashland, Ky., has let a contract for the erection of buildings to the Moore Construction Company, Charleston, W. Va. The buildings include a two-story boiler house and a one-story engine house. The mechanical equipment will be electrically operated, and a 150-hp. engine and a 100-kw. generator will be installed.

The Edgewood Consolidated Coal Company, Middlesboro, Ky., is planning the installation of a coal washer and other machinery. Edward J. Douglass is general manager of the company.

One hundred coke ovens will be erected by the Rockhouse Coal Mining Company, Pinesville, Ky., it is reported.

G. D. Holliday and others are planning the erection of a water plant at Berea, Ky.

The Munfordville Milling & Lumber Company, Munfordville, Ky., is asking for prices on power equipment, including two 100-hp. boilers, as well as special corn-milling machinery.

The Board of Education, Lexington, Ky., has appropriated \$900 for the purchase of six lathes which will be installed in the manual training department of the high school.

Judge C. O. Prowse, Hopkinsville, Ky., plans the erection of an aeroplane factory. Nashville, Tenn., will probably be selected as the location of the enterprise.

The American Tobacco Company and the R. J. Reynolds Tobacco Company will erect redrying plants for handling leaf tobacco in Lexington, Ky., according to the Commercial Club of that city.

Luther Stivers, Lexington, Ky., will erect a tobacco factory at an estimated cost of \$50,000.

D. A. Emmitt and George L. Emmitt, Maysville, Ky., are planning the erection of a large whisky distillery.

The White's Run Oil Company, Carrollton, Ky., has been organized for the purpose of developing oil lands in Carroll county. Joseph Baker, Henry Davis and others are interested.

The plant of the Central City Foundry & Machine Company, Central City, Ky., was destroyed by fire February 4, with a loss of \$10,000. Most of the loss is covered by insurance, and E. B. Miller, owner of the plant, expects to rebuild.

The Globe Metals, Rare Earths & Oil Exploration Company is the style of a corporation organized at Marion, Ky., and chartered in Arizona, with \$3,000,000 capital stock. It is stated that its chief plan is to develop fluorspar deposits in Crittenden and Livingston counties, Ky. Headquarters will be at Marion, Ky. David C. Loveless, Salem, Ky., is one of those interested in the company, which will erect a plant for milling fluorspar.

V. R. Vickers, chief engineer for the Burlington Railroad, is quoted as saying that the cost of the bridge across the Ohio at Paducah, Ky., which will be shared by the Louisville & Nashville, Illinois Central, Frisco & Burlington, will be \$3,600,000 and that shops will be built by the companies either jointly or severally at Paducah. Bids for the construction of the bridge are to be opened March 15. Much will also be spent in the construction of terminals.

The Ohio Valley Pulley Works, Maysville, Ky., which recently incorporated with \$50,000 capital stock, is making some additions to its equipment. The plant will also be enlarged from a structural standpoint.

The American Automobile Mfg. Company, New Albany, Ind., has gone into the hands of a receiver, the New Albany Trust Company being appointed. The company was organized in Louisville about a year ago for the manufacture of motor cars, but has been hampered by lack of working capital. Its debts, which aggregate about \$50,000, include some to machinery interests, as a good deal of equipment has been installed. It is planned to reorganize and continue operations.

St. Louis

St. Louis, Mo., February 12, 1912.

The status of the machine tool business evidences no particular change. There is still the usual run of single tool orders and some replacement work, as well as some inquiry for second-hand equipment. Dealers are beginning to feel that there is little likelihood of any special activity soon, or perhaps until after the election is out of the way. In the more southern portion of St. Louis territory there is still hesitation as to expansion because of the low price of cotton, which seems to have been the chief cause of conservatism.

The plant of the J. E. Bulls Corrugated Paper & Box Company was destroyed by fire February 9 with a loss of \$40,000. It will rebuild and re-equip with new machinery.

The St. Louis Envelope & Paper Bag Company, a merger with \$120,000 capital stock of three concerns in St. Louis, has leased new quarters and will extend as well as combine the mechanical equipment.

The Koken Barbers' Supply Company has completed plans to erect a new factory building to cost \$70,000 and will equip it with machinery for the manufacture of metal barber chairs and other similar supplies.

The Byrnes Belting Company has completed the raising of \$60,000 additional capital for the extension of its plant and equipment, a new building being provided therefor.

The St. Louis Motor Truck Company, with \$75,000 capital stock, has been incorporated here by C. H. Joerding, E. L. Haydock and John P. Camp to manufacture motor trucks in a new plant to be established here.

Fire at Breese, Ill., February 5 destroyed the engine and boiler houses of the North Breese Coal & Mining Company, with a loss of \$50,000. The power plant will be rebuilt and re-equipped.

The City Council of Paxton, Ill., has granted a franchise to the Consumers' Electric Light, Heat & Power Company, with a 30 years' term, to construct, equip and operate a public service plant, in competition with the Paxton Electric Company, already in operation. Construction work is to begin by March 6 and be finished by next fall.

The Diamond Flint Glass Company, Vincennes, Ind., is negotiating for the establishment of a \$100,000 plant with new equipment at St. Charles, Ill. The company is represented in the transaction by H. S. Warrick, secretary and manager.

The Banner Clay Works, Edwardsville, Ill., has placed bonds for \$110,000 for the purpose of extending its mechanical equipment and thereby increasing its output.

The Rock Island Railroad has announced plans to build and equip large railroad shops at Hurlburt, Ark., which will be near the terminus of a new bridge across the Mississippi River to be built for the joint use of that road, the Cotton Belt and the Iron Mountain as an additional entrance to Memphis, Tenn.

Texas

AUSTIN, TEXAS, February 10, 1912.

Irrigation development in the western and southern portions of Texas is creating a greater demand for pumping machinery than ever known in the State. Many new projects are being announced and some of them involve very large expenditures of money. The demand for all classes of machinery shows a good increase. Dealers take a very roseate view of the present situation and outlook. The renewal of political troubles in Mexico has had a depressing effect upon the activities that were beginning to be shown in business and trade circles of that country.

C. T. Jackson and associates will install machinery for grinding peanuts in their cotton seed oil mill at Cleburne.

The City Council of Terrell has taken steps to increase the water supply by boring new wells. It will also lay a large amount of additional mains.

The City Commission of Austin will submit to a vote of the people the proposition of issuing \$250,000 of bonds for the construction of sewers.

Henry Weiser and Frank Weiser have purchased the electric light and power plant at Dublin from the Dallas Securities Company. It will be moved to another part of town and improvements made to it.

Steps have been taken at Greenville to organize a

company for the installation of an ice plant of 50 tons capacity. The Booster Club, of which John H. Erickson is secretary, is aiding the project.

The Whiffle-Tree Attachment Company, which was recently formed at Lindale with a capital stock of \$10,000, is preparing to erect a manufacturing plant to make a patented whiffle-tree attachment.

Preparations are being made to begin work on the construction of a sewer system at Forney. Bonds in the sum of \$12,000 were recently issued for the purpose.

The Toyah Light & Ice Company, Toyah, has entered into a contract with the City Council for the lighting of the town. A number of street lights will be installed and improvements will also be made to the company's plant.

The American Sugar Refining & Mfg. Company, of Salt Lake City and Denver, is investigating the situation at Pecos with a view of erecting a large sugar beet factory.

The land department of the Kansas City, Mexico & Orient Railroad, which recently purchased a tract of 42,000 acres of land near Alpine, is preparing to install a system of irrigation that will cost more than \$1,000,000. In order to provide a water supply for irrigating the land a large dam will be constructed across a deep canyon. Surveys are being made for the proposed dam and canal system and construction work will soon be started. The project is being financed by the Commercial Trust Company, Kansas City.

The Armour Company is reported to have under consideration the establishment of a meat-packing plant at Victoria.

The Southern Welding & Machine Company, San Antonio, is preparing to manufacture a patented automobile tire pump.

A syndicate of Minneapolis, Minn., men is preparing to construct a large irrigation system near Van Horn, Tex. A number of shallow wells will be sunk and upon these will be installed pumping plants.

E. F. Glaze has purchased the electric light plant at Edna and will make improvements.

The San Angelo Power & Street Railway Company is the name of the reorganized corporation which has taken over the street railway system at San Angelo, which was operated under the ownership of J. D. Sugg. It is announced that the company will erect a new power house, purchase a large amount of new equipment and greatly extend the system.

John Woodriddle is preparing to erect a plant at San Angelo for the manufacture of a new cotton gin which he recently invented and patented.

W. W. Culberson will erect a large sash and door factory at Waco.

M. C. Gregory will install an eight-stand cotton gin at Harlingen.

The electric light and power plant at Fredericksburg is to be improved by installing two new dynamos. A new 125-hp. engine was put in recently.

McNey & Duff, Terrell, will move their foundry and machine shop from that place to Temple. The new plant will embrace a foundry building, blacksmith and pattern shops and a number of smaller buildings.

J. B. Randolph and associates will construct a system of irrigation near Junction for the purpose of irrigating 12,000 acres of land. A large dam will be constructed across the South Llano River.

The Malone Water Company, which was recently formed with a capital stock of \$3,100, is preparing to put in a system of water works at Malone.

The Empire Bottling & Mfg. Company will install a large bottling works at Greenville. C. L. Bell is president, F. M. Davis, of Dallas, secretary-treasurer and manager.

The Marshall Fertilizer factory, which has a capital stock of \$15,000, will install a fertilizing plant at Marshall. The incorporators are John Copeland, F. W. Grann and C. H. Boyer.

W. G. Kleime, of Cleveland, Ohio, who recently purchased a 120,000-acre ranch near San Angelo, is preparing to install an extensive system of sub-irrigation upon the land.

The Union Slaughtering Company, of Galveston, is installing a meat-packing plant and abattoir there at a cost of about \$50,000.

The Timpson Handle factory at Timpson, which was recently destroyed by fire, is to be rebuilt.

The People's Oil & Gas Company has been formed at Wichita Falls with a capital stock of \$250,000. It will develop a large tract of oil and gas land.

Robert Beers and associates will install a vinegar and by-product factory at Roswell, N. M., at a cost of about \$25,000.

Surveys are being made for the laying of a water works and distributing system at Las Cruces, N. M.

Frank M. Redfield is preparing to erect a mill at Anthony, N. M., for the manufacture of alfalfa meal.

The City Council of Beaumont has adopted plans for the installation of an abattoir to cost \$25,000.

The Parral Fire Grade Company will install a large plant at Parral, Mexico, for the manufacture of fire brick, common brick, face brick, fire-proofing and drain tile.

The Muchacho Grande Mining Company will install a concentrator at its mines in the Alamos district, Sonora, Mexico.

The Sisson syndicate will erect a 200-ton concentrating plant at Tesla, Sonora, Mexico.

The Yaqui River Consolidated Gold & Copper Company will install a large amount of new machinery upon its property near Willcox, Ariz. J. H. Reagan, Nogales, Ariz., is a member of the executive committee.

The Tepozan Gold Mines, Ltd., will erect a large cyanide plant at Los Azules, Chihuahua, Mexico. John F. Johnson is general manager.

The Empire Mining Company will install a mill at its Gold Cross mine in the Cananea district, Sonora, Mexico.

The Pacific Coast

PORTLAND, ORE., February 6, 1912.

A perceptible improvement is noted in the machine tool market, though as yet there is no great activity, and few individual orders have been placed for more than two or three tools. There is considerably more activity in other lines of equipment, mill and wood-working machinery being as usual in the lead. Both manufacturers and agents for this line of machinery are highly optimistic regarding the outlook, and expect a heavy movement during the spring. Loggers are beginning to extend their railroads to new timber districts, and inquiries are coming out for locomotives, trucks and yarding engines. Notwithstanding the comparatively large business already done in cannery equipment, there is still considerable demand. Pumping machinery is rather quiet at the moment, but conditions in the interior are favorable for a large movement of irrigating equipment later in the season. Occasional orders are coming out for quarry and clay working machinery, but business in these lines is a rather uncertain factor.

The Olympic Portland Cement Company intends to start work early in the spring on a large rock crushing plant at Kendall, Wash.

The Johnson-Bradford Safe Company is planning to erect a new factory at Linnton, near this city.

It is announced that the Seaside, Ore., Door & Lumber Company will build a three-mile railroad and open new logging camps.

Clemons & Rhode have purchased a woodworking shop at Hillsboro, Ore., and will add a lot of new machinery.

C. A. Stevens, Oakland, Ore., is installing a lot of new woodworking equipment.

The Portland Cement Company expects to complete its plant at Oswego, Ore., in a few months, and is figuring on additional installation when the work now under way is completed.

Bids were received recently for the construction of new shop buildings for the Northern Pacific Railroad near Spokane, Wash. It is not believed that any material addition will be made to the equipment for the present.

The Meese & Gottfried Company, San Francisco, Cal., dealer in transmission equipment, has established a new branch at Spokane, Wash., under the management of W. H. Wroughton.

The Clay Products Company, operating near Spokane, Wash., is figuring on the establishment of a new plant in that city.

The Robinson Mfg. Company, Everett, Wash., is putting in a number of new woodworking machines and changing its motive power throughout to electricity.

The Idaho National Harvester Company, Moscow, Idaho, is installing a number of improvements, including an air compressor and bolt machines.

H. L. Bennett, a box manufacturer of Seattle, Wash., will shortly install a new engine and boiler.

The Seattle Candy & Cracker Company, Seattle, Wash., has placed orders for a lot of new machinery to be installed in the spring.

The Seattle Car Mfg. Company recently changed its

name to the Seattle Car & Foundry Company. The plant at Renton, Wash., is to be enlarged, a 5-ton cupola being the first addition planned.

Thomas Bros. are planning to start a new flour mill, with electric power, at Springfield, Ore.

The town of Bellingham, Wash., has arranged to install an auxiliary electric light plant at a cost of about \$6,000.

It is reported that the Champlin Dredge Company, operating near Medford, Ore., will build a new outfit at a cost of about \$100,000.

The Oriole Gold Mining Company, operating near Grants Pass, Ore., plans to install a 50-ton ore mill in the spring.

The Wendling-Johnson Lumber Company, which recently purchased extensive timber lands in the Siuslaw country, west of Eugene, Ore., plans to erect a large mill in that district.

The Dow-Mirreles-Diesel Engine Company, San Francisco, Cal., has been incorporated with a capital stock of \$750,000, by G. A. Dow, G. E. Nolan, A. J. Coogan, M. L. Choynski and J. T. O'Connor.

Eastern Canada

TORONTO, ONT., February 10, 1912.

Although the winter is one of the severest of which living Canadians have had experience, industrial operations and trade have been well maintained in the state of activity noted at the beginning of the year. It is true, paper has not been so well met as manufacturers, merchants and bankers expected, but shortcoming on that account causes no uneasiness. Business men know that the backwardness of payments is not due, as it was in so many cases a year ago, to want of means. The wealth is in the country, but, owing to the lateness of the Western harvest, the marketing of the grain was delayed, the railroads finding the season between harvest and the close of navigation too short for the forwarding of all the grain awaiting shipment. The grain will be marketed, and the proceeds will be available for debt paying and purchasing, though there will have to be some patience shown.

In eastern Canada there are marked evidences of response to the approach of spring, efforts being made to get works in readiness for increased output.

There is some observable hesitation on the part of British investors in respect to new capital offerings from Canada. This is a consequence of some exceptional flotation that have been made from this side. With more scrupulousness on the part of some Canadian promoters and more pains on the part of the Canadian authorities to ascertain and advise British investors as to the character of undertakings to put their money into, it is expected that the flow of British funds to this country will continue as strong as ever.

It is announced that the Dominion Steel Corporation will this year erect a large warehouse at Montreal, which will be a distributing centre of the products of the company's mills. The company is also expected to put vessels on the St. Lawrence that can take cargo to the head of the Lakes.

The directors of the Arcadian Sugar Refining Company, Halifax, N. S., will rebuild the company's plant recently destroyed by fire.

The Consolidated Pulp & Paper Company has been formed to establish a large paper mill at St. John, N. B., in connection with the Partington pulp mill there. Its capital stock is to be \$5,000,000.

J. C. Macintosh & Co. have purchased a controlling interest in the Nova Scotia Knitting Mills at Bureka, N. S., and propose to make a large outlay on new equipment.

The Colonial Knitting Company, of Guelph, Ont., has been incorporated with a capital stock of \$100,000, and will commence operations in a short time.

Part of the machinery for the Kingston Brick & Tile Company's plant, Kingston, Ont., is being installed, and the company hopes to be making brick by spring. The plant will have a capacity of 40,000 bricks a day, with machinery capable of turning out 60,000 bricks daily.

D. E. Evans, of Port Colborne, Ont., is reported to have been advised from Ottawa that the Government would pass an order in Council granting the request of the large delegation of Port Colborne business men, who visited Ottawa a few weeks ago, asking the Government for a free site and certain dockage privileges for the Buffalo Smelting Company, which desires to locate a Canadian branch of their plant there.

The Mond Nickel Company has acquired a site of 2,400 acres, upon which to erect a smelter at Coniston, Ont.

It is reported that the Federal Sign System Company, Chicago, will establish a Canadian branch in Hamilton, Ont. It is further said that the company has arranged for a supply of power from the Cataract Power Company.

The work upon the extension of the Canadian Locomotive Works, Kingston, Ont., will be commenced almost immediately. Plans are being rapidly laid for the contemplated enlargements. The vacant property between the present locomotive works and the Grand Trunk Railway yards will be used as the site for new buildings. These will be erected as soon as possible and enough machinery installed to keep faith in regard to the recent contracts. Additional floor space will be obtained by the erection of additional stories upon the present buildings.

The Goldie & McCulloch Company, Galt, Ont., is making an extensive addition to its boiler plant.

The Canadian Steel Foundries contemplates the erection of a blast furnace at Welland, Ont., the cost of which will be about \$1,500,000. Additional property for the site required is under negotiation.

The Tabe-Sellew Motors Company, Ltd., Toronto, has been incorporated with a capital stock of \$1,000,000 to manufacture motors, etc. Among the directors are John B. Holden, D. W. O'Sullivan and George A. Grover.

The Canadian Machinery Corporation, Galt, Ont., has acquired the plant of the London Machine & Tool Works, at Hamilton, Ont., and will continue its operation with business headquarters at Galt.

The Kinnell Mfg. Company, Ltd., Morrisburg, Ont., has been granted provisional charter with a capital stock of \$50,000 by the Dominion government to manufacture horse shoes. Directors, Arthur and Wm. W. Flynn and W. Allison.

Western Canada

WINNIPEG, MAN., February 9, 1912.

The enforced holding over of a large percentage of the grain has made money somewhat scarce. If the elevator capacity were anywhere near what is required for storing the grain the farmers would be able to make use of storage certificates, but the very large proportion of the grain is stowed away in all kinds of makeshift granaries. Further, much of the grain is unthreshed, and, worst of all, a considerable quantity is still in the shock. The situation has had its effect to make current business relatively quiet, but another consequence is its added stimulus to the building of railroad lines, of elevators, of railroad equipment and of terminal accommodations of all kinds. Great as have been the enterprises of railway companies and the expansion of railroad mileage in Western Canada, they seem but to create larger railway needs. The building of branch lines has promoted settlement and multiplied the volume of freight to be carried on the trunk lines, so that these require to be double-tracked, even treble-tracked, and to have their car and power equipment, as well as their elevator capacity, very largely and very rapidly increased. The demand for rails and railroad equipment in western Canada promises to be enormous. There seems no serious ground for doubt that the capital needed for bringing the railroad systems of the West more nearly up to the growing traffic requirements will be readily obtainable.

The B. C. Electric Railway Company, Vancouver, B. C., will build an extension to its system, the water end of the new line to be Deep Cove, where important terminal structures will be put up.

The Rock City Tobacco Company, Quebec, Que., is reported to be considering plans for the establishment of branch works at Calgary, Alberta.

E. J. Chamberlin, general manager of the Grand Trunk Pacific, recently announced the year's construction, which he states will amount to \$20,000,000. This includes the building of 600 miles of branch lines, connecting with the main line from Winnipeg westward to the Rocky Mountains, and completing the main line through the mountains, leaving only 50 miles to be finished in 1913.

Three water wheels, the largest of the kind in America, will be among the features of the gigantic power development to be undertaken this year by the B. C. Electric Railway Company, Vancouver, B. C. The plans provide for the enlargement of the generating station on the North Arm of Burrard Inlet so as to make an available output from the plant of 85,500

hp. This practically means the doubling of the present output of the generating station. The contract for these waterwheels has been awarded to the John McDougall Caledonian Iron Works Company, Ltd., Montreal, and the award for the generators has been made to Dick, Kerr & Co., London, England. At Lake Buntzen alone the company's development work calls for an expenditure this year of \$1,000,000 on equipment and buildings. The electrical generators will each be of 9000 kw.

George M. Gibbs, a mining broker of Vancouver, B. C., and others, including Henry K. Owens, of Seattle, and James D. Sword, a mining engineer, who has been a resident of British Columbia for many years, are planning the formation of a company to establish and operate a plant in or near Vancouver to manufacture iron and steel.

The M. Rumely Company, La Porte, Ind., manufacturer of threshing machines, farm machinery, etc., is credited with the intention of establishing a new plant in western Canada, possibly at Calgary, Alberta.

The Canada Malting Company will spend \$25,000 on the construction of works at Calgary, Alberta.

The Moose Jaw Fire Brick Pottery Company, Moose Jaw, Sask., will open up business on an extensive basis this spring.

Rapid progress is being made in preparation for the construction of the \$1,000,000 cement plant which is to be erected on Saanich Arm, Tod Inlet, east coast of Vancouver Island, B. C., by the Portland Cement Construction Company. The plant is to cover five acres and is to be one of the most complete, modern and efficient on the coast. Its capacity will be about 2000 barrels per day.

F. A. Yerbury, the new general manager of the Heaps Engineering Company, who is to have charge of the works which the Heaps Company proposes to establish in the vicinity of Vancouver in the near future, has arrived in that city. Among the new enterprises which the Heaps Company plans to establish will be an electric steel making furnace in connection with a rolling mill plant. This electric furnace will be of the Kjellin type. Another line of industry which the company has planned to undertake is the manufacture of internal combustion engines of the Diesel type, burning crude oil.

The Saskatchewan Flour Mills Company, Ltd., will immediately rebuild Robin Hood Flour Mills, at Moose Jaw, Sask., with a capacity double that of the old plant. In addition to flour and oatmeal mills, the company will build a 500,000 bushel elevator.

Government Purchases

WASHINGTON, D. C., February 13, 1912.

The Paymaster General, Navy Department, Washington, will open bids under schedule 4328, class 31, February 27, for one 75-ton crane runway; class 42, one electric freight elevator; class 51, one vertical drilling machine, one hydrostatic wheel press and one vertical milling machine; schedule 4264, class 1, one tandem steam road roller; schedule 4265, class 11, one double seaming machine, motor driven; schedule 4266, class 21, ten pumps with spare parts.

The Department of the Interior, United States Reclamation Service, Fallon, Nev., will open bids February 26, for furnishing and delivering one electric power shovel.

The Isthmian Canal Commission, Washington, will open bids March 8, under canal circular 681, for furnishing motors, pumps and switches as follows: Class 1, 18 motors for guard-valve machine, 80 motors for hand rail gearings, 22 motors for spillway gate machines; class 2, miscellaneous pumps and motors; class 3, 149 float switches, 149 automatic starters and 10 starters for compensators.

The United States Engineer Office, Little Rock, Ark., will open bids April 9, for constructing two steel hull, 24-in. pump dredges.

The United States Reclamation Service, Los Angeles, Cal., opened bids, January 29, for one 2-in. vertical, direct connected, motor driven pump as follows: Krogh Mfg. Company, Los Angeles, Cal., \$343; Byron-Jackson Iron Works, Los Angeles, Cal., \$359.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids February 6, for material and supplies for the Navy Yards as follows: Schedule 4223, class 1, one double disk grinder, bidder 16, Charles H. Besly & Co., Chicago, Ill., \$800 and \$900; 111, Gardiner Machine Company, Beloit, Wis., \$1,195; 187, Oliver Machinery Company, Seattle, Wash., \$745.

Trade Publications

Disk Grinding Machine.—Gardner Machine Company, Beloit, Mich. Folder entitled "A Shop Sensation." Calls attention to the increased output of journal box caps which was made possible by the substitution of a disk grinder for a milling machine. By the change it was possible to produce 60 pieces per hour instead of 10 as was the case with the milling machine, while at the same time the weight of the finished castings was reduced together with the surface area. Half-tone and line engravings showing the two different types of pieces are given as well as views of the operation being performed on the two machines.

Reamers.—Kelly Reamer Company, 1555 Columbus road, Cleveland, Ohio. Leaflet. Points out the advantages of using the adjustable high speed boring tools and floating reamers of this company for finishing the interior of engine cylinders instead of boring them nearly to size and then grinding them to size and finish. When using the tools of this company, it is pointed out that it is possible to bore a cylinder to within 0.005 in. and then ream with a floating reamer which gives the correct size to within 0.0001 in. and leaves a smooth surface free from grit.

Condensing Apparatus.—Schutte & Koerting Company, Philadelphia, Pa. Two catalogue sections. The first, which is section B of catalogue No. 5, refers to the use of the Koerting multi-jet eductor condenser without an air pump. This condenser is designed for use where the amount of water used is very large and a high vacuum has to be maintained. The construction of this condenser is described at length and there are a number of engravings showing it installed. Catalogue No. 6, section B, deals with the company's centrifugal spray nozzle for re-cooling water. The special advantages claimed for them are high efficiency, simplicity, economy and low cost.

Air Compressors.—Ingersoll-Rand Company, 11 Broadway, New York City. Form No. 3210. Describes the class NE-1 power-driven single-stage straight-line air compressors, which consist of an air cylinder supported by a main frame with a piston operated by a center crank shaft having a belt wheel on one side and a flywheel on the other. The air inlet valves on the smaller machines are all of the direct lift type and on the larger machine the Hurricane inlet valves are standard. Cushioned direct lift discharge valves are used on all sizes. The positions of the shaft and the belt and the flywheel can be reversed if it is desired to place the belt wheel on the opposite side. Several sectional elevations of the compressors are given and tables of sizes and capacities, which range from 42 to 627 cu. ft. are included.

Expansion Bolts.—F. H. Evans, 31 Hewes street, Brooklyn, N. Y. Circular. Shows the various styles of Crescent expansion bolts and gives a list of the various sizes made. The standard sizes range from $\frac{3}{16}$ to $1\frac{1}{4}$ in. in diameter and from $1\frac{1}{4}$ to 16 in. in length, although special sizes up to a maximum diameter of 3 in. can be furnished if desired.

Twist Drills and Cutters.—Union Twist Drill Company, Athol, Mass. Catalogue F. Size, $5\frac{1}{2} \times \frac{3}{4}$ in.; pages, 262. Is a revised book of information superseding all previous editions. The various types of cutters are illustrated and this is followed by information of the various tooth shapes, sizes of gear teeth and sizing and cutting of gears. The latter half of the catalogue is devoted to the drills manufactured by this company and the line covers practically all the sizes and styles in regular use. All of the different types of cutters and drills are illustrated with brief tables of specifications. A number of tables of useful information, such as cutting speeds, decimal equivalents, metric conversion factors and weights of various sizes of square and round bars, are included.

Induction Motor.—Wagner Electric Mfg. Co., 6400 Plymouth avenue, St. Louis, Mo., Bulletin No. 95. Gives general description and specifications for the type BW polyphase induction motor. Curves showing the performance characteristics of this motor are reproduced and a number of applications in which it can be substituted for the squirrel cage type and also for the wound rotor type where speed variation is not required are touched upon and two of them are illustrated.

Shaft Coupling.—Charles Bond Company, 520 Arch street, Philadelphia, Pa. Circular. Devoted to the Grundy patent flexible insulated coupling which is constructed in three pieces, the two outer flanges being of cast iron while the center disk is of non-conducting material with lugs at each side for transmitting the power to the outside flanges. This coupling can be run in either direction at high or low speed and is especially adapted for connecting motors to pumps, machine tools, sewing machines and woodworking and printing machinery, blowers, etc.

Electric Condulet Fittings.—Crouse-Hinds Company, Syracuse, N. Y. Pamphlet entitled "Condulet Pocket Reference." This pamphlet is designed for the use of electricians on the job and contains a list of covers and fittings for condulets together with the company's porcelain fittings for cleat, molding, condulet box, temporary and decorative installations. These are arranged alphabetically according to the letter designating the type.

Corliss Valve Gear.—Bates Machine Company, Joliet, Ill. Bulletin No. 36. Describes and illustrates the new Bates inertia

valve gear which is now regularly applied to all the Corliss engines built by this company. The special features of the gear are positive and quiet operation and the absence of both springs and rollers. An illustrated description of this valve gear appeared in *The Iron Age*, August 24, 1911.

Planers.—Joseph T. Ryerson & Son, Sixteenth and Rockwell streets, Chicago, Ill. Catalogue. Size, $8\frac{3}{4} \times 11$ in.; pages, 15. This is the planer section of the firm's large machine tool catalogue and covers the heavy duty, variable speed and motor-driven planers built by the Rockford Machine Tool Company, Rockford, Ill. A general description of the machine is given and this is followed by illustrations, brief descriptions and specification tables of the 24, 28, 32 and 36-in. machines.

Pumps and Steam Turbines.—Alberger Pump Company, 140 Cedar street, New York City. Catalogue D. Concerned with a line of centrifugal, volute, single and multi-stage turbine, condenser, fire, mine, water, feed, elevator and water works pumps, adapted for operation by electric motors, steam engines and turbines, gas and gasoline engines, hydraulic turbines and belts and a special type of steam turbine intended for driving the centrifugal pumps. The development and theory of the centrifugal pump are first taken up, followed in turn by descriptions of the design and construction of the various types of pump, the text being supplemented by half tone engravings. The application and use of the centrifugal pump are then discussed. A number of tables of dimensions and useful information complete the catalogue.

Fire Brick.—Harbison-Walker Refractories Company, Pittsburgh, Pa. Catalogue. Contains considerable useful information in connection with the use of fire brick for boiler settings. All of the standard shapes of brick are illustrated and their dimensions given. This is followed by instructions for sending orders for various styles of settings and there are a number of illustrations of various types of boilers. The way in which these bricks are made is described at length with illustrations and a number of tables of useful information complete the catalogue.

Pipe and Well and Pipe Supplies.—Mark Mf- Company, Chicago, Ill. Catalogue No. 11. Covers an extensive line of pipe and pipe and well supplies which includes wrought line and drive pipe, well and irrigation casing, boiler tubes, drive well points, well cylinders and valves and pipe tools. All of these are illustrated and briefly described and condensed tables of specifications with prices are included.

Tube Grinder and Polisher.—The Tube Bending & Polishing Machine Company, 1300 Bayard street, Baltimore, Md. Bulletin No. 1. Concerned with an automatic grinding and polishing machine for pipes, tubes and rods, which is capable of handling stock ranging from $\frac{3}{4}$ to $2\frac{3}{4}$ in. external diameter. This machine can be operated either as a polisher for buffing and polishing brass and copper tubing and rods or for grinding and polishing steel pipes and brazed or welded tubing. An illustration of the machine in operation and a condensed table of specifications are included in the bulletin.

Turbo Gas Blowers.—The Terry Steam Turbine Company, Hartford, Conn. Bulletin No. 12. Gives the results of a very interesting investigation made into the prevailing practice regarding gas blower sets. These results have been tabulated, supplemented by text information, and several types of blowers are illustrated.

Electrical Machinery and Appliances.—The General Electric Company, Schenectady, N. Y. Eight bulletins. No. 4857 describes the company's switchboard and high tension relays for alternating and direct current. Each type of relay is illustrated and the bulletin contains general notes on the use of relays including a diagram of modern power house wiring and bus bars and location of relays. No. 4859 is devoted to a line of synchronous condensers which are especially adapted for floating on the line for improving the power factor. No. 4871, superseding No. 4268, calls attention to the use of mercury are rectifiers for charging batteries. The fourth bulletin, No. 4873, illustrates and describes in considerable detail the line of control apparatus for steel mills which has been designed with a view to meeting the severe conditions encountered in steel mill operation. Among the various pieces of apparatus shown are automatic compensators, contactors and master and rheostatic controllers. Nos. 4876 and 4877 illustrate and describe two lines of small direct-current switchboards. Views of various combinations of apparatus are shown and connection and dimension diagrams are included. No. 4882 calls attention to an inclosed flame arc lamp which utilizes impregnated carbon electrodes. The illuminating efficiency of the lamp, together with the simplicity of its mechanism, renders it an ideal unit for the economical illumination of large areas. Designs suitable for all classes of commercial service are included. The eighth and last bulletin, No. 4884, is entitled "The Lighting of Iron and Steel Works." The advantages of good illumination from the standpoints of production quantity and cost and safety of the employees, are discussed, and this is followed by a description of various types of lamps which can be supplied. All of these lamps are illustrated, and there are a number of engravings showing different lighting installations. Tables giving the various types of lamps and the illumination intensities recommended for different classes of service met with in plants of this nature complete the bulletin.

Current Metal Prices

The following quotations are for small lots. New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly report.

IRON AND STEEL— Bar Iron from Store—

| | |
|---|----------|
| Refined Iron: | |
| 1 to 1½ in. round and square | lb 1.70¢ |
| 1½ to 4 in. x ½ to 1 in. | lb 1.80¢ |
| 1½ to 4 in. x ½ to 5-1 | lb 1.80¢ |
| Rods—½ and 11-16 round and square. | |
| Angles: | |
| 3 in. x ½ in. and larger | lb 1.80¢ |
| 3 in. x 3-16 in. and ½ in. | lb 2.20¢ |
| 1½ to 2½ in. x ½ in. | lb 1.85¢ |
| 1½ to 2½ in. x 3-16 in. and thicker | lb 1.85¢ |
| 1 to 1½ in. x 3-16 in. | lb 2.00¢ |
| 1 to 1½ in. x ½ in. | lb 2.10¢ |
| ¾ x ½ in. | lb 2.15¢ |
| ¾ in. x ½ in. | lb 3.35¢ |
| ¾ x 3-32 in. | lb 4.40¢ |
| Tees: | |
| 1 in. | lb 2.25¢ |
| 1½ in. | lb 2.10¢ |
| 1½ to 2½ x ½ in. | lb 1.90¢ |
| 1½ to 2½ x 3-16 in. | lb 2.00¢ |
| 3 in. and larger | lb 1.80¢ |
| Beams: | |
| Channels, 3 in. and larger | lb 1.80¢ |
| Bands—1½ to 6 x 6-16 to No. 8 | lb 2.00¢ |
| Burden's "H. B. & S." Iron, base price | lb 2.95¢ |
| "Burden's Best" Iron, base price | lb 3.15¢ |
| Norway Bars | lb 3.60¢ |

Merchant Steel from Store—

| | |
|---|--------------|
| Bessemer Machinery | lb 1.70¢ |
| Toe Calk, Tire and Sleigh Shoe | 2.50 @ 3.00¢ |
| Best Cast Steel, base price in small lots | 7¢ |

Sheets from Store—

| | |
|---|----------|
| Black | |
| One Pass, C.R. R.G. Soft Steel. Cleaned | |
| No. 16 | lb 2.40¢ |
| Nos. 18 to 20 | lb 2.45¢ |
| Nos. 22 and 24 | lb 2.50¢ |
| No. 26 | lb 2.55¢ |
| No. 28 | lb 2.65¢ |

Russia, Planished, &c.

| | |
|---|----------------------|
| Genuine Russia, according to assortment | lb 12 @ 14½ |
| Patent Plainished, W. Dewees | |
| Wood | lb A. 10¢; B. 9¢ net |

Galvanized

| | |
|--|----------|
| Nos. 12 and 14 | lb 2.75¢ |
| No. 24 | lb 3.10¢ |
| No. 26 | lb 3.30¢ |
| No. 28 | lb 3.60¢ |
| No. 20 and lighter 36 inches wide, 25¢ higher. | |

Genuine Iron Sheets— Galvanized

| | |
|----------------|----------|
| Nos. 22 and 24 | lb 5.50¢ |
| No. 26 | lb 6.00¢ |
| No. 28 | lb 7.00¢ |

Corrugated Roofing—

| | | |
|--------------------|--------------------|--------|
| 2½ in. corrugated. | Painted. | Galvd. |
| No. 24 | 100 sq. ft. \$3.75 | \$4.70 |
| No. 26 | 100 sq. ft. 2.85 | 3.90 |
| No. 28 | 100 sq. ft. 2.50 | 3.65 |

Tin Plates—

American Charcoal Plates (Per Box)

| | |
|---------------|--------|
| AAA Charcoal: | |
| IC, 14 x 20 | \$6.35 |
| IX, 14 x 20 | 7.60 |
| A Charcoal: | |
| IC, 14 x 20 | \$5.30 |
| IX, 14 x 20 | 5.40 |

American Coke Plates—Bessemer—

| | |
|-------------|----------------|
| IC, 14 x 20 | 107 lb. \$4.20 |
| IX, 14 x 20 | 5.20 |

American Terne Plates—

| | |
|----------------------------------|--------|
| IC, 20 x 28 with an 8 lb coating | \$8.10 |
| IX, 20 x 28 with an 8 lb coating | 10.10 |

Seamless Brass Tubes—

| | |
|------------------------|-----------------|
| List November 13, 1908 | Base price, 18¢ |
|------------------------|-----------------|

Brass Tubes, Iron Pipe Sizes—

| | |
|------------------------|----------------|
| List November 13, 1908 | Base price, 1¢ |
|------------------------|----------------|

Copper Tubes—

| | |
|------------------------|-----------------|
| List November 13, 1908 | Base price, 21¢ |
|------------------------|-----------------|

Brazed Brass Tubes—

| | |
|-----------------------|---------|
| List February 1, 1911 | 20½¢ lb |
|-----------------------|---------|

High Brass Rods—

| | |
|-----------------------|---------|
| List February 1, 1911 | 15½¢ lb |
|-----------------------|---------|

Roll and Sheet Brass—

| | |
|-----------------------|--------|
| List February 1, 1911 | 16¢ lb |
|-----------------------|--------|

Brass Wire—

| | |
|-----------------------|---------|
| List February 1, 1911 | 15½¢ lb |
|-----------------------|---------|

Copper Wire—

| | |
|-------------------------------|------|
| Base Price, Carload lots mill | 15½¢ |
|-------------------------------|------|

Copper Sheets—

| | |
|---|--------|
| Sheet Copper Hot Rolled, 16 oz. (quantity lots) | lb 19¢ |
|---|--------|

| | |
|--|--|
| Sheet Copper Cold Rolled, 1¢ lb advance over Hot Rolled. | |
|--|--|

| | |
|--|--|
| Sheet Copper Polished 20 in. wide and under, 1¢ square foot. | |
|--|--|

| | |
|---|--|
| Sheet Copper Polished over 20 in. wide, 2¢ square foot. | |
|---|--|

| | |
|--|--|
| Planished Copper, 1¢ square foot more than Polished. | |
|--|--|

| | |
|-------------------------------------|--|
| Tinning, one side, 3½¢ square foot. | |
|-------------------------------------|--|

METALS—

Tin—

| | |
|-------------|--------------|
| Straits Pig | lb 47¢ @ 48¢ |
|-------------|--------------|

Copper—

| | |
|--------------|---------------|
| Lake Ingot | lb 15¼ @ 15½¢ |
| Electrolytic | lb 15¼ @ 15½¢ |
| Casting | lb 15 @ 15¼¢ |

Spelter—

| | |
|---------|-------------|
| Western | lb 7½ @ 7½¢ |
|---------|-------------|

Zinc—

| | |
|--------------------|----------------------|
| No. 0, base, casks | lb 8½¢. Open, lb 9½¢ |
|--------------------|----------------------|

Lead—

| | |
|--------------|-------------|
| American Pig | lb 5¼ @ 5½¢ |
| Bar | lb 6¼ @ 7¢ |

Solder—

| | |
|------------------|---------------|
| ½ & ¼ guaranteed | lb 26¼ @ 27¢ |
| No. 1 | lb 24¼ @ 24½¢ |
| Refined | lb 22¼ @ 23¼¢ |

Prices of Solder indicated by private brand vary according to composition.

Antimony—

| | |
|--------------|---------------|
| Cookson | lb 10¼ @ 10½¢ |
| Halletts | lb 10 @ 10½¢ |
| Other Brands | lb 9 @ 9½¢ |

Bismuth—

| | |
|--------|-----------------|
| Per lb | \$2.00 @ \$2.25 |
|--------|-----------------|

Aluminum—

| | |
|---|----------------|
| No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting (ton lots) | 19¼¢ |
| Rods & Wire | Base Price 31¢ |
| Sheets | Base Price 33¢ |

Old Metals—

Dealers' Purchasing Prices Paid in New York.

| | |
|----------------------------|-------|
| Copper, heavy and crucible | 12.25 |
| Copper, heavy and wire | 12.00 |
| Copper, light and bottoms | 11.00 |
| Brass, heavy | 8.50 |
| Brass, light | 6.50 |
| Heavy machine composition | 10.50 |
| Clean brass turnings | 8.00 |
| Composition turnings | 9.00 |
| Lead, heavy | 3.75 |
| Lead, tea | 3.25 |
| Zinc, scrap | 4.75 |

Nicholson Files and Rasps

PRODUCE RESULTS



A workman's value to you depends on his own proficiency *and the tools with which he works.*

To provide your men with **Nicholson Files and Rasps** is to increase their ability to produce better results in less time.

And **Nicholson Files and Rasps** have a knack of keeping out of the scrap heap.

Ask for "File Philosophy."

Nicholson File Company
Providence, Rhode Island, U. S. A.

